Corp. History & Mission Statement

98

A Brief Outline
of the History

of

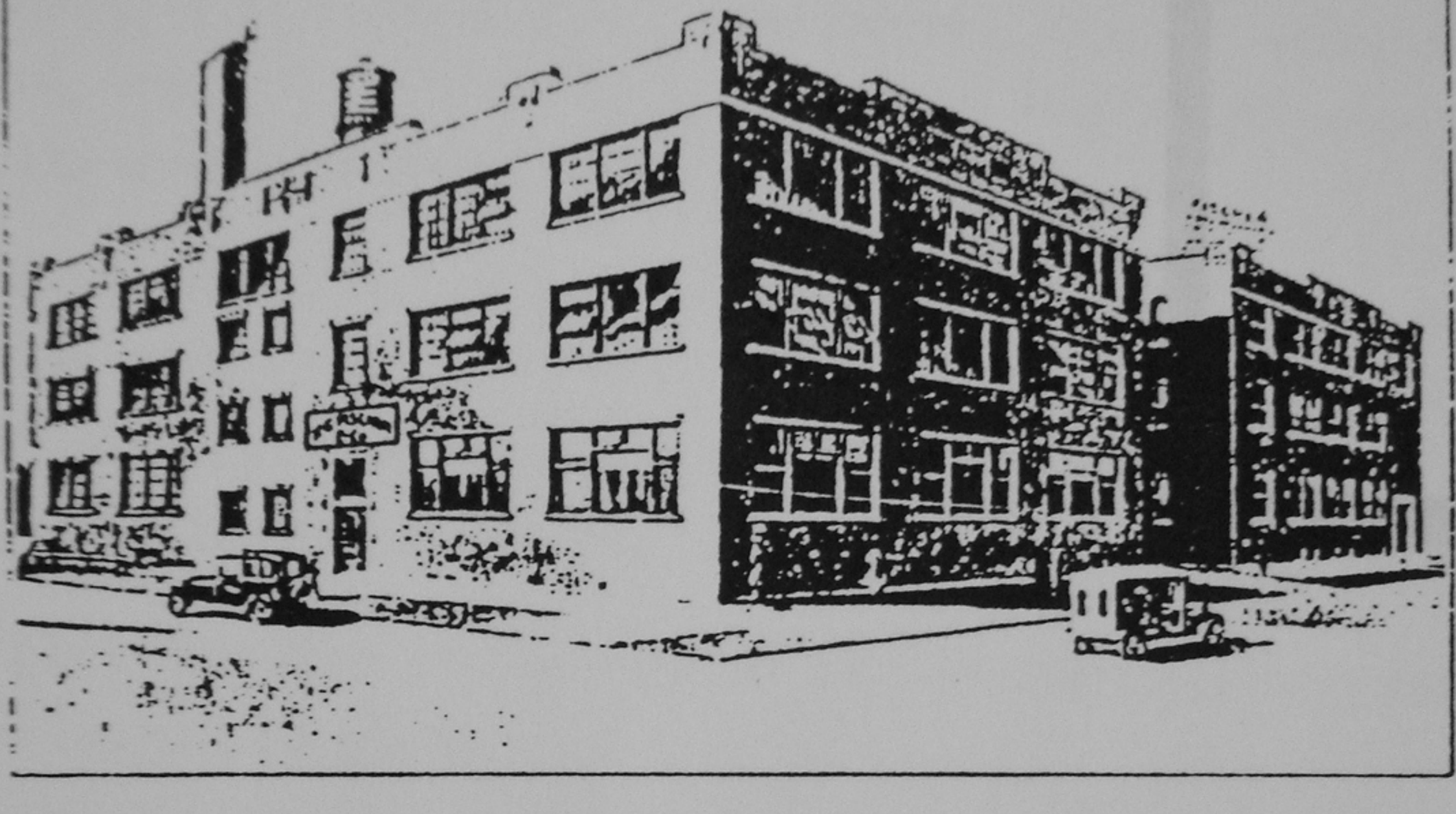
H. G. FISCHER & COMPANY

INCORPORATED

2333-43 Wabansia Avenue

CHICAGO



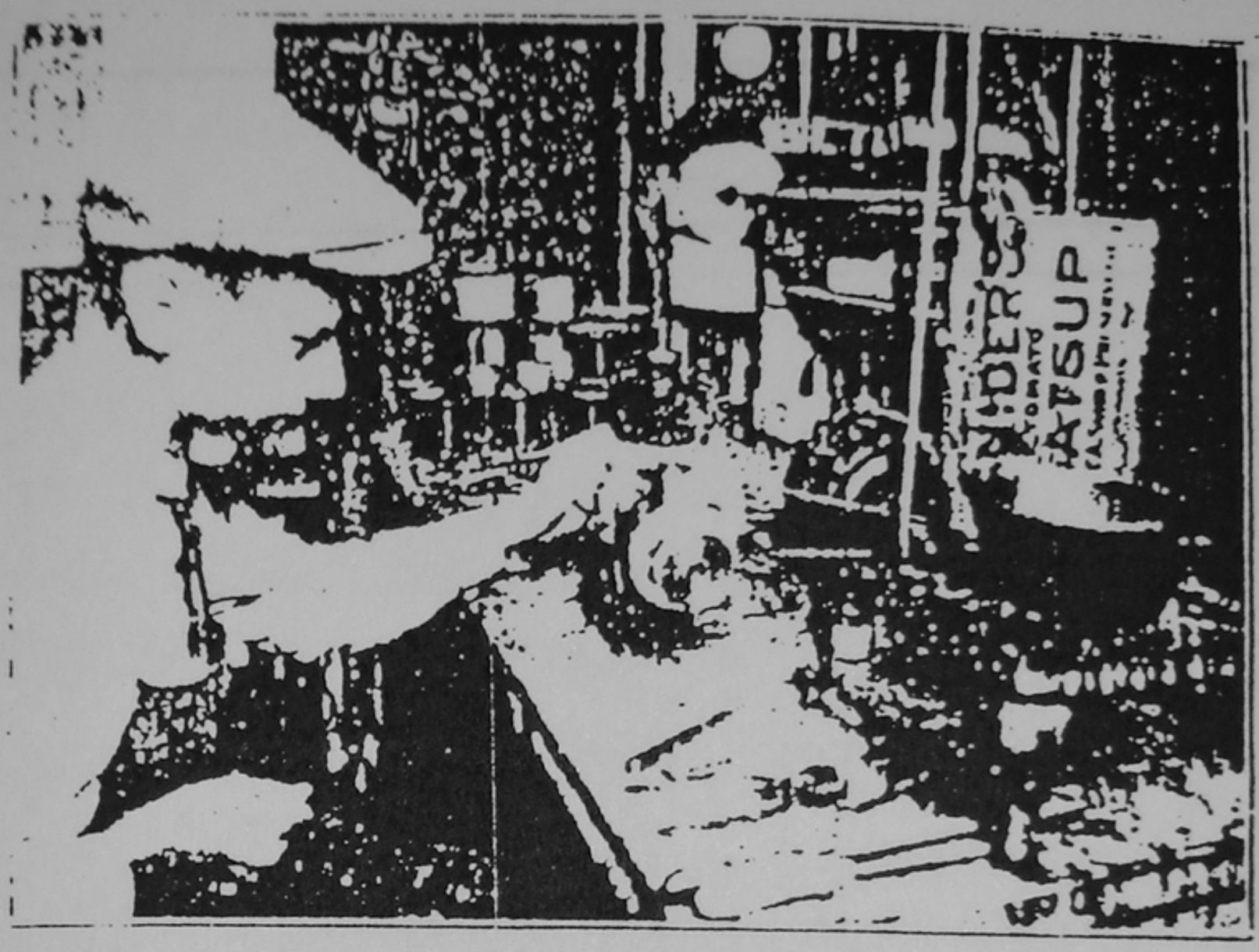


The Home of Fischer

QUALITY, COURTESY
AND SERVICE

2333-43 Wabansia Avenue

CHICAGO



The First Fischer "Factory"

THE HISTORY of H. G. Fischer & Company, Inc., is an industrial epic of accomplishment. From a one-room basement shop to the top of the ladder in an even dozen years. Twelve years of steady, irresistible growth — a victorious march of success — from an *idea* to an *industry*.

Twelve years ago H. G. Fischer & Company, Inc., began the manufacture of High Frequency machines, a type of electrical apparatus which was beginning to find favor among physicians for the treatment of certain forms of disease.

The one-room basement shop, one man and one coil-winding machine comprised the factory and the

manufacturing organization. Truly, not a very elaborate layout—but, behind this modest establishment was an idea—a vision of the future—that Electro-Physiotherapy, practiced along scientific lines, was to be inevitably the one big development in the medical field.

The first Fischer machines were decided improvements over existing types, and found a ready market, and the rapidly increasing demand soon forced a move to larger quarters.

This was the awakening of the seedling—the giant had begun to grow.

The next Fischer Factory was a rented space—a rather secluded building of triangular shape, with the main entrance on an alley.

The number of employes gradually increased, more efficient machines constructed, much experimental work engaged in, and the Fischer line so broadened that in a remarkably short time additional floor space was imperative.



A new mill-constructed building had just been completed in the neighborhood, and the entire third floor was leased.

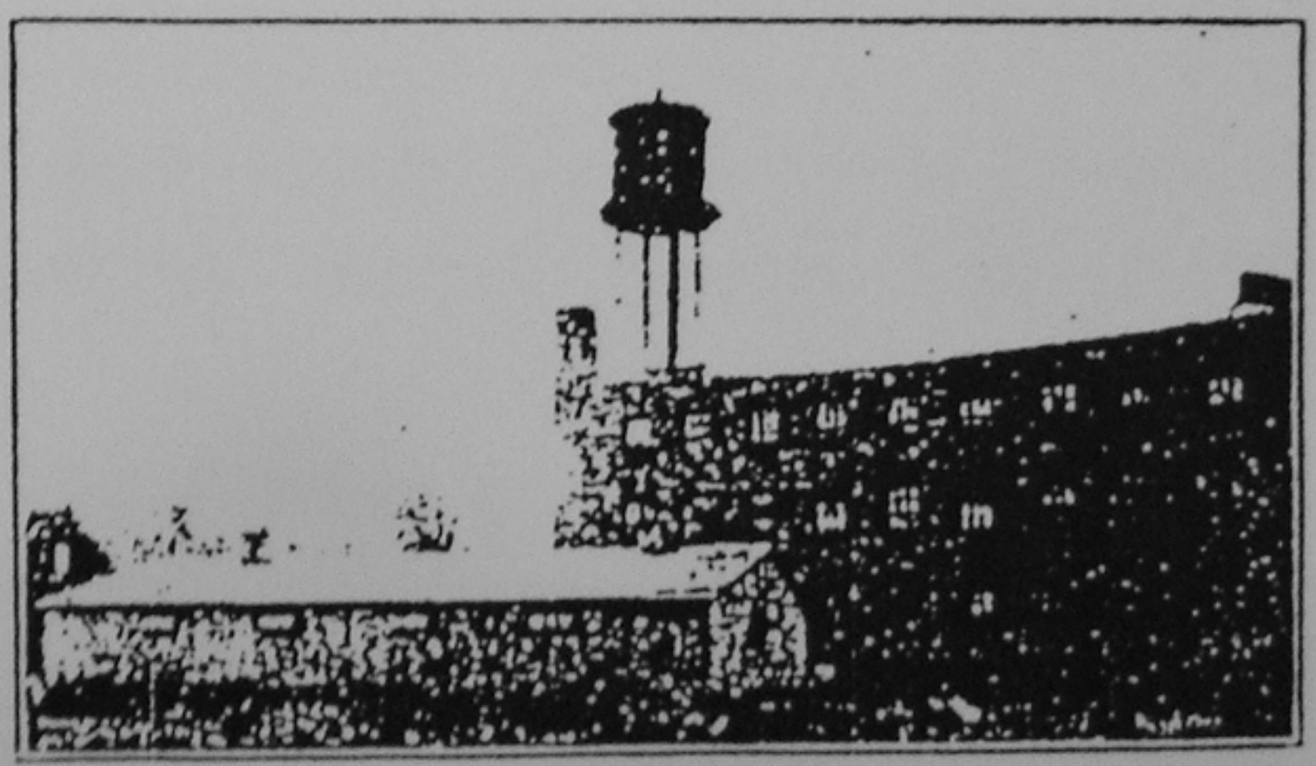
In less than a year's time the second floor had been added to the third; a year later two neighborhood stores were rented for manufacturing purposes; also a considerable space for storage.



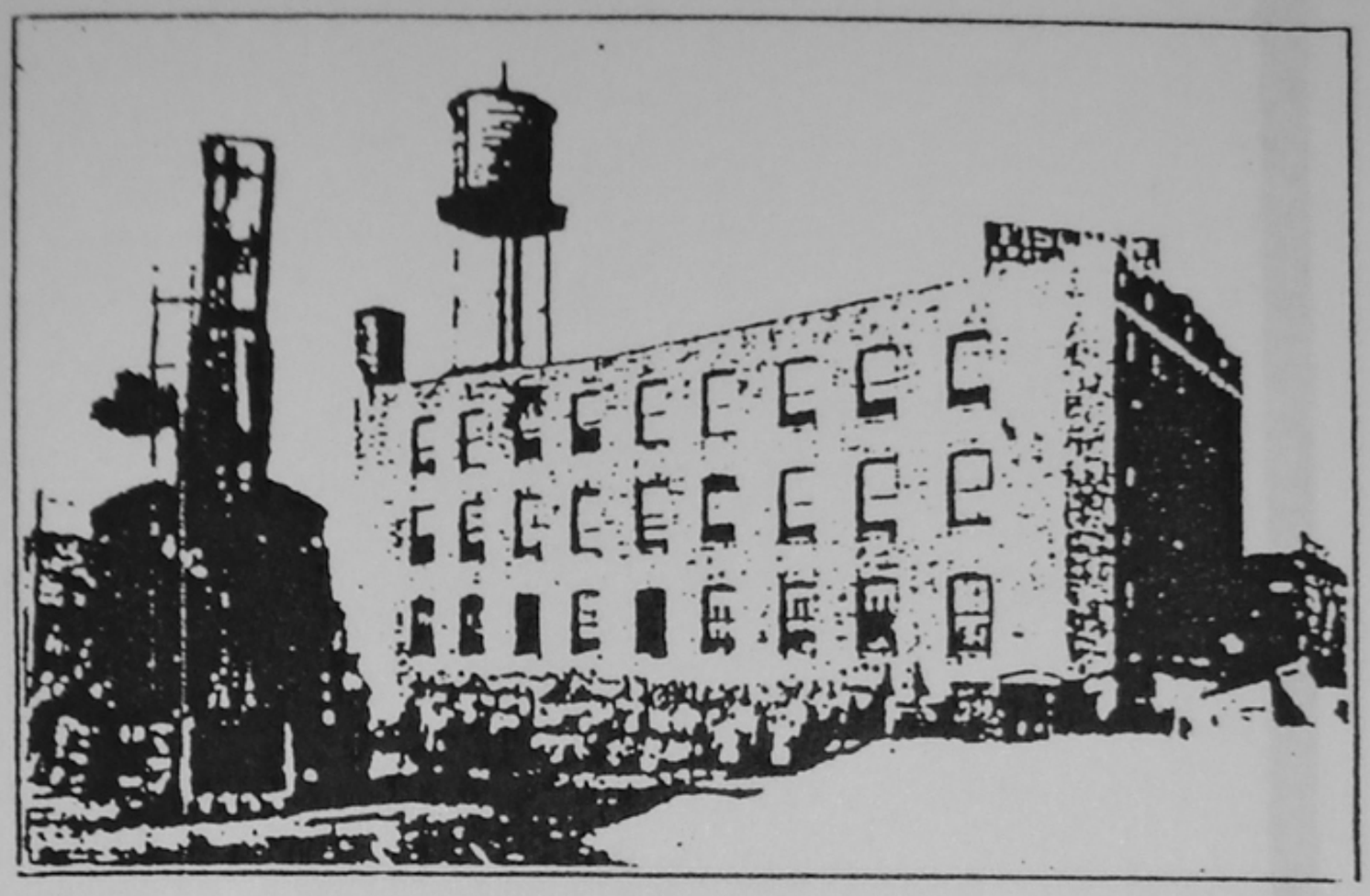
Laying Foundation for Warehouse

The vacant land east was purchased and a steel warehouse erected—and as rapidly as each new space was provided it was filled to overflowing.

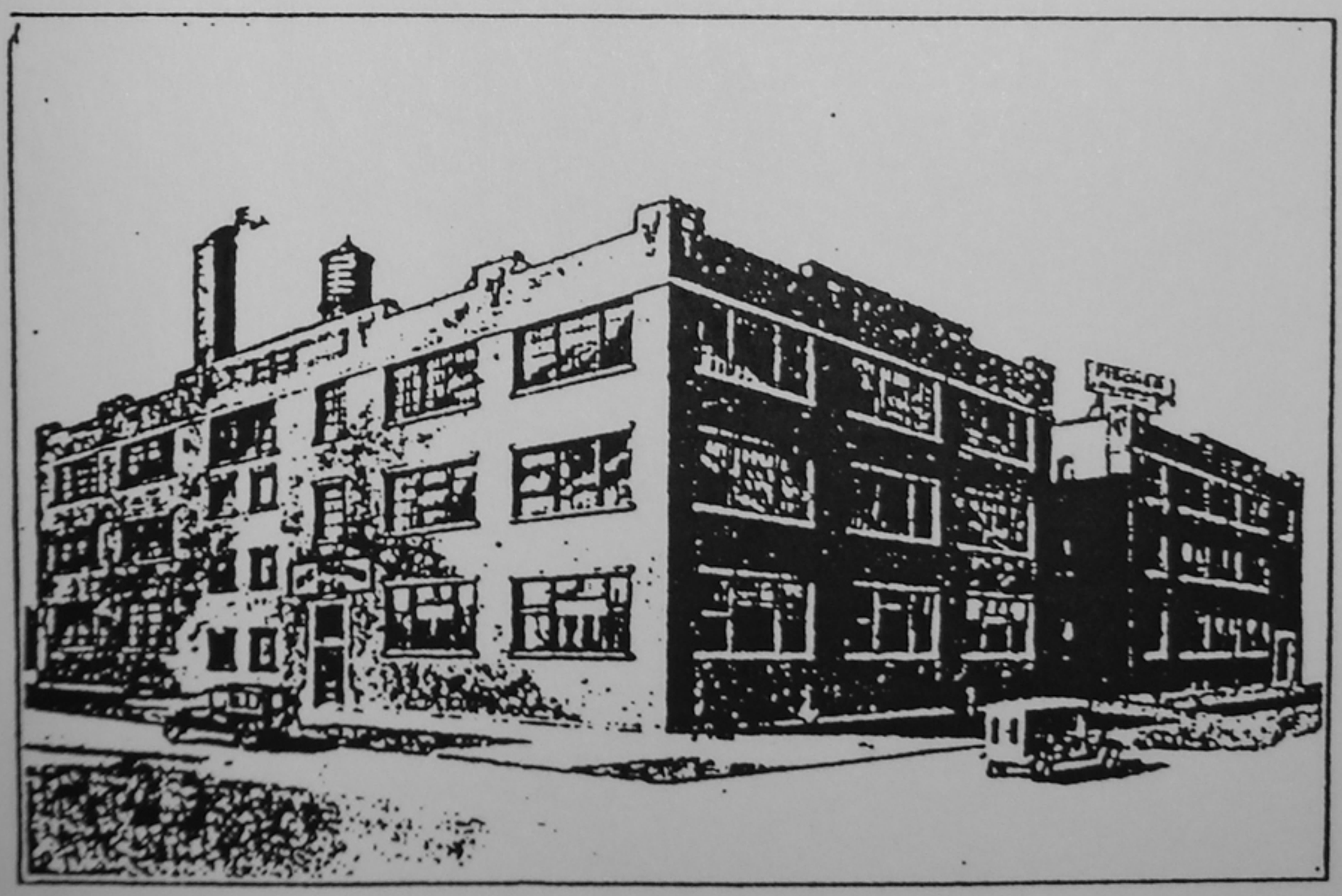
Expansion followed expansion—additional property was purchased, and a great, modern three-story mill-constructed brick factory, with the most approved sprinkler system for fire protection, was erected.



Warehouse Completed



Breaking Ground for the New Factory



We Now Occupy These Premises, and the Capacity Is Utilized to the Limit

The greatest stimulant toward Physiotherapeutic progress and general acceptance by the medical profession was the recent European war. Physicians and surgeons saw apparently hopeless cases resurrected, and, as has been stated, the Physiotherapy service became in truth "the human salvage service."

H. G. Fischer & Company, Inc., has had a big share in this development. Fischer equipment and Fischer service are well known to thousands of physicians because practically every Reconstruction Hospital and branch of the Veterans' Bureaus was equipped with Fischer apparatus.

New devices and ideas are constantly being developed and tested—there is no let-up in the effort to improve and refine Fischer apparatus, and to increase its usefulness and efficiency. Physicians everywhere are showing their appreciation of and confidence in H. G. Fischer & Company's efforts in producing better equipment and rendering the best possible service, with constant repeat orders—the *finest* tribute.

A trip through the Fischer plant brings out many interesting and educational facts. The pictures in this booklet show but a few of the hundreds of operations involved in the manufacture of Physicians' Electrical Equipment.

Take a walk through this splendid, completely equipped plant —we want you to meet the Officers and Directors of H. G. Fischer & Company, Inc., to see the various departments in action, and shake hands with the "boys" who are responsible for the conduct of the institution.



H. G. Fischer
President and Treasurer



H. T. Fischer
Secretary
Director of Sales



P. P. Musket
Vice President
Electrical Engineer

Officers and Directors



Chas. Musket
Director
Factory Superintendent



A. W. Mathis
Director
Manager, Retail Sales



H. H. Osborn
Master Mechanic
Superintendent of Works





First, let us visit the General Office, shake hands with Mr. P. H. Brown, upon whose shoulders rests the responsibility of office routine, with the many and varied attendant duties.

Here, in an orderly group, are the executive, sales, advertising, order, billing, bookkeeping, service, record, filing, purchasing, costs, draughting and mailing departments.

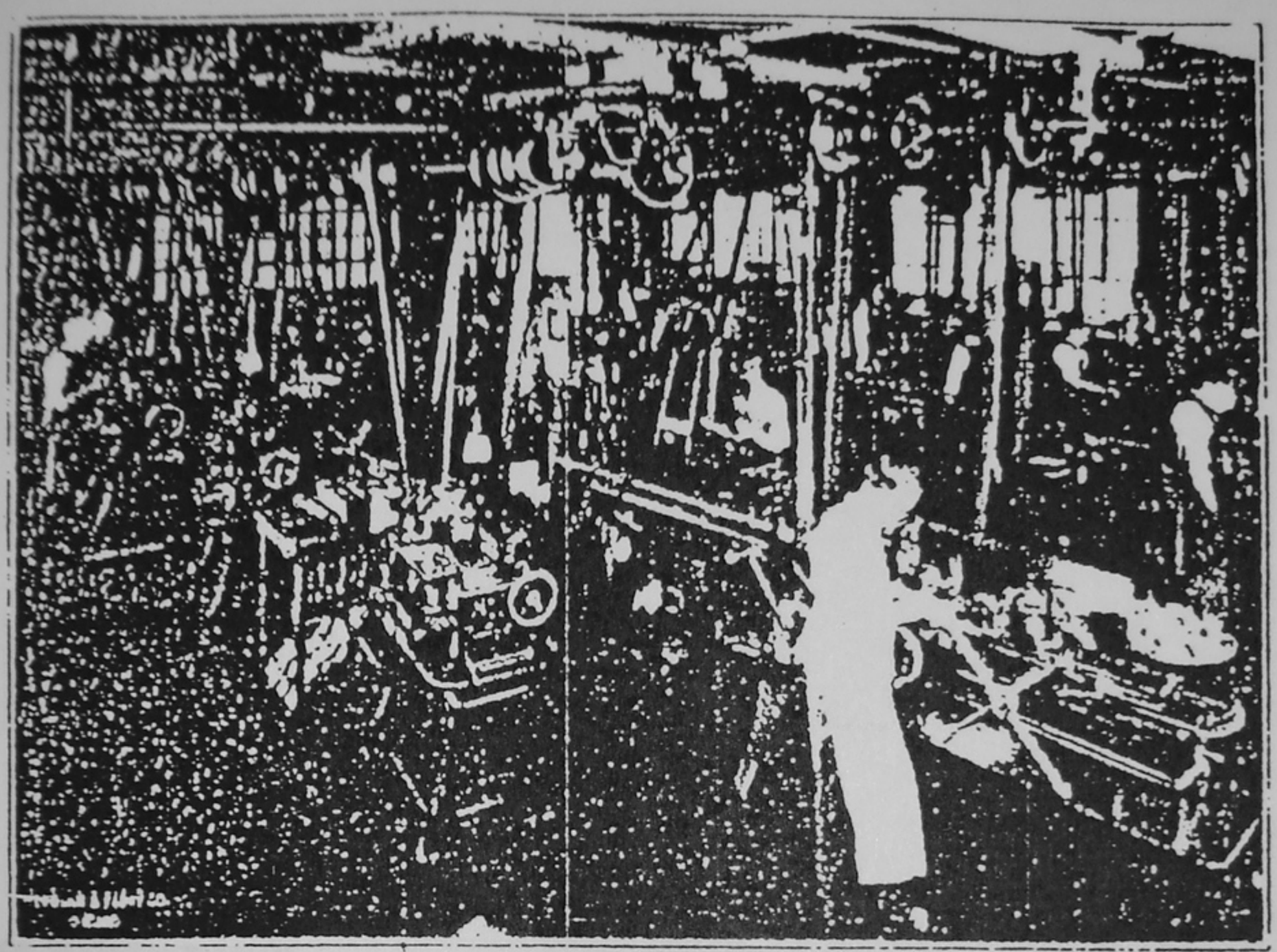
Accuracy and Service are the watchwords—your rush order received in the morning is entered, filled, shipped and billed often before noon, and any service called for is given attention immediately.



This is our Mailing Department, where upward of 18,000 "Fischer's Magazines" are sent out every month. An educational paper, sent to a select list of physicians, mostly operators of Fischer equipment, offering many valuable suggestions pertaining to the use and care of Electrical Apparatus.

Through this medium H. G. Fischer & Co., Inc., are building up a very close contact with users of their equipment, and are creating a demand as well as bringing about a much broader understanding of the scientific principles which underlie electrotherapy.

Note the steel and concrete vault—a great value is placed on records. Every evening all desks are cleared—the vault receives all valuable papers.



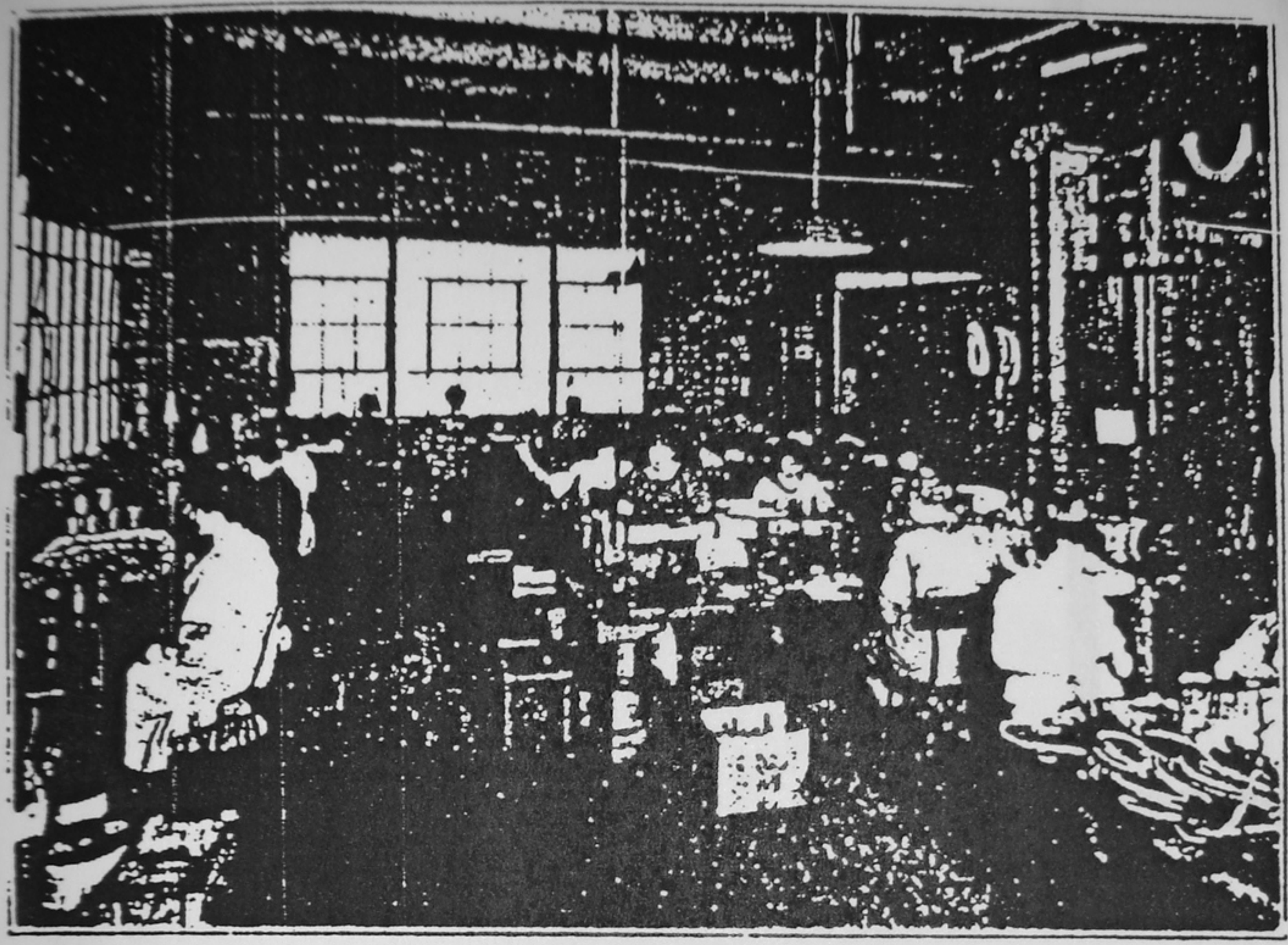


Let us now pass through the plant.

Mr. Chas. Musket, *Factory Superintendent*, bids you welcome to the machine shop. Here the pulsing and humming of busy machines brings a feeling of real activity to the visitor.

Modern machinery, skillfully manned, cutting, punching, grinding, bending and shaping the raw material preparatory to the assembling operations, greets the eye. Automatic equipment is continually chewing up steel, brass, copper, silver, rubber, bakelite, fibre, etc., and turning out parts to the tune of over 50,000 a day.

Bob, our clever toolmakers' foreman, guarantees that his accurately made tools, jigs and dies will exactly duplicate parts—that's why replacements on Fischer Apparatus are easy to take care of.



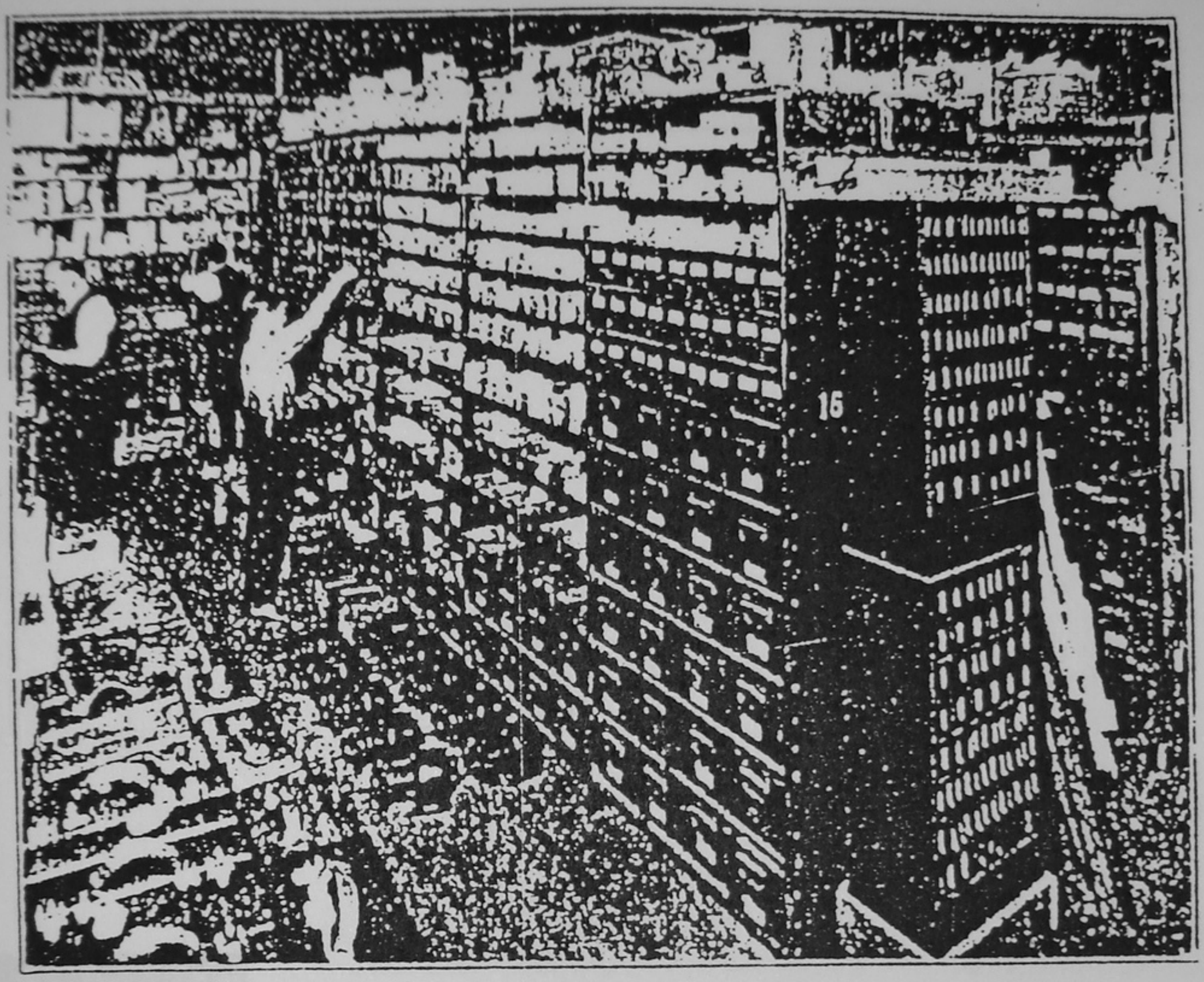
Mr. John Ingstad is foreman of the Coil Winding and Cable Department.



Did you ever stop to figure that it takes thousands of turns of wire, sometimes no heavier than a hair, totalling many thousands of feet, yes, several miles, to make a high tension transformer such as is used in X-ray and Diathermy machines?

Every turn is counted—every turn and layer is carefully insulated from the others, that the finished product may be guaranteed against breakdown.

If you could look through the wall to the right you would see these same coils being carefully bound and mounted, ready for their final immersion into oil tanks.





What do we do now with all these intricate and numerous parts? Let's go in the Part Stock Room and ask Mr. Frank Emmerling, who has charge.

Too bad we can't show you the other tiers of steel stock racks, but the camera man said it was too difficult. Inventory figures show just how many hundreds of thousands of parts are always carried on hand in this section.

Every part is ordered out on requisition, and every part, having been carefully gauged and made with properly designed tools, will fit just exactly where it is intended without alteration.

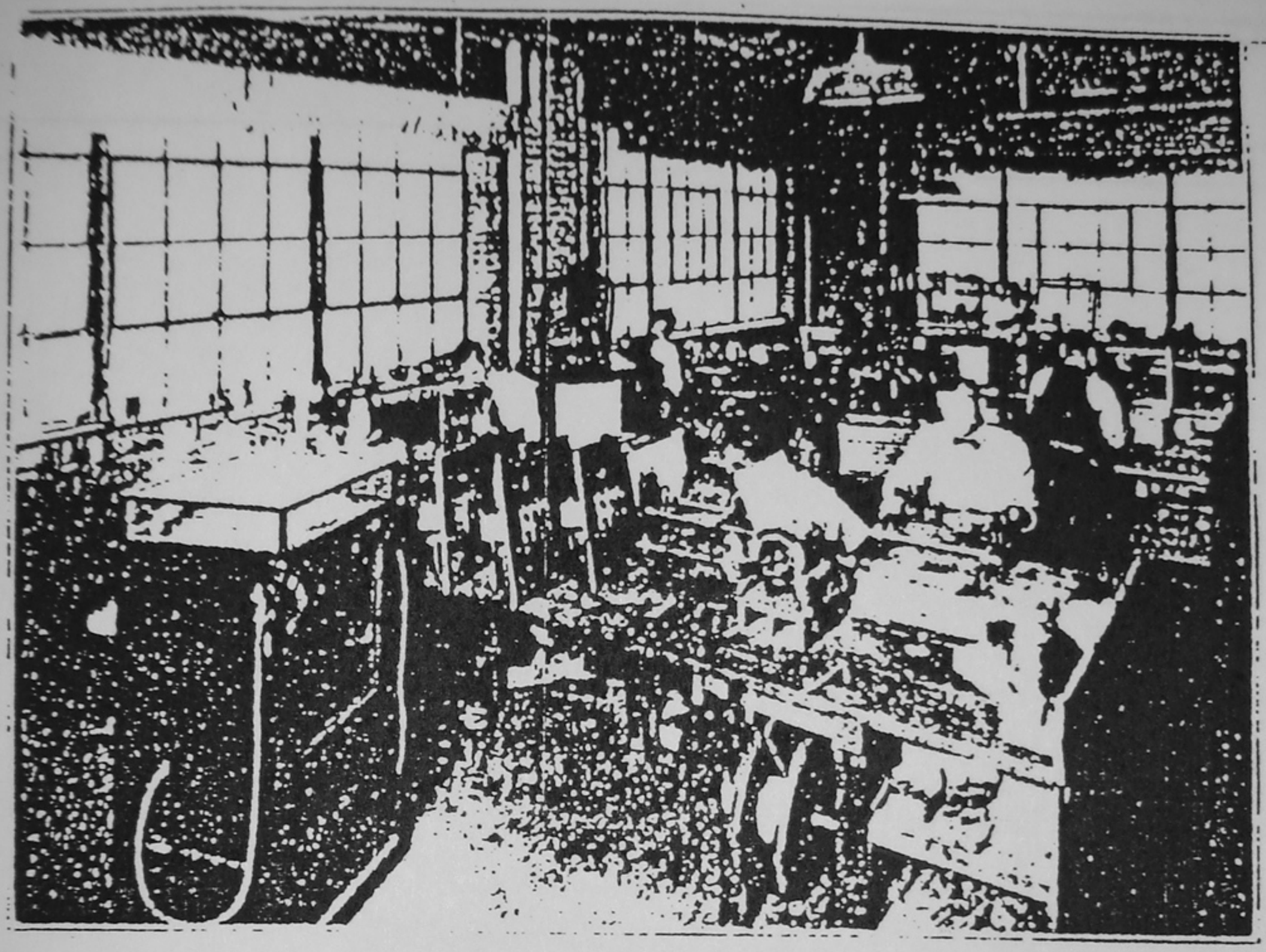


Did you know that we did all our own Glass Blowing? Meet Mr. Ed. Wandner, who is a past master in the art of making brittle, plain glass tubing into seemingly impossible shapes.



Not Ed. alone—all of our glass-blowers are masters of their trade. We make our own X-ray tubes, high frequency electrodes, insulating tubes, and effect all manner of glass repairs.

You can draw your own conclusions as to the value of being able to produce vacuum tubes of all types, pumped just exactly correct for the apparatus with which such tubes are to be used.





So far you have seen a lot of parts being made up—let's go into the Assembling Department; we want you to shake hands with Mr. Arthur Nowicki. Art has been with us for so long that he can put electrical apparatus together with his eyes closed, and get it right.

In this picture is shown only a small corner of the assembling floor. A personal visit, with plenty of time allowed for each step, is necessary before one can grasp the importance of this division.

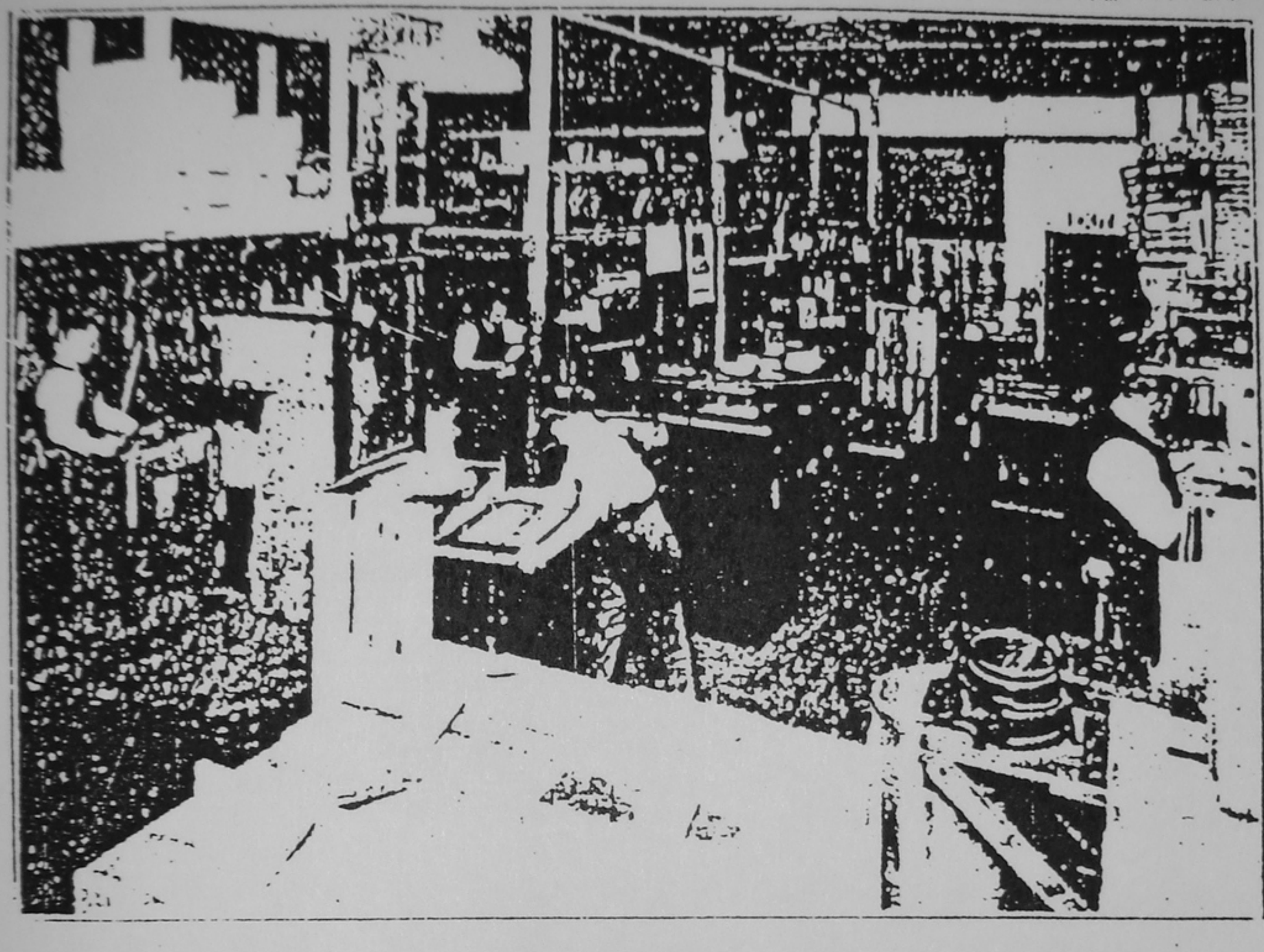
Here the parts are taken from stock and built into cabinets or portable carrying cases under careful, constant supervision.





Every item manufactured by H. G. Fischer & Company, Inc., or which passes through our hands must go through the Inspection Department. Mr. Joe Herzog sure is one excellent sleuth when it comes to locating defects—he really should be a member of the Pinkerton staff.

Never mind, Joe, we mean that as a compliment. We must find errors, if errors there are, right here; and we do correct many items. On the other hand, there are mighty few complaints from our customers simply because we do pay so much attention to careful inspection and testing.



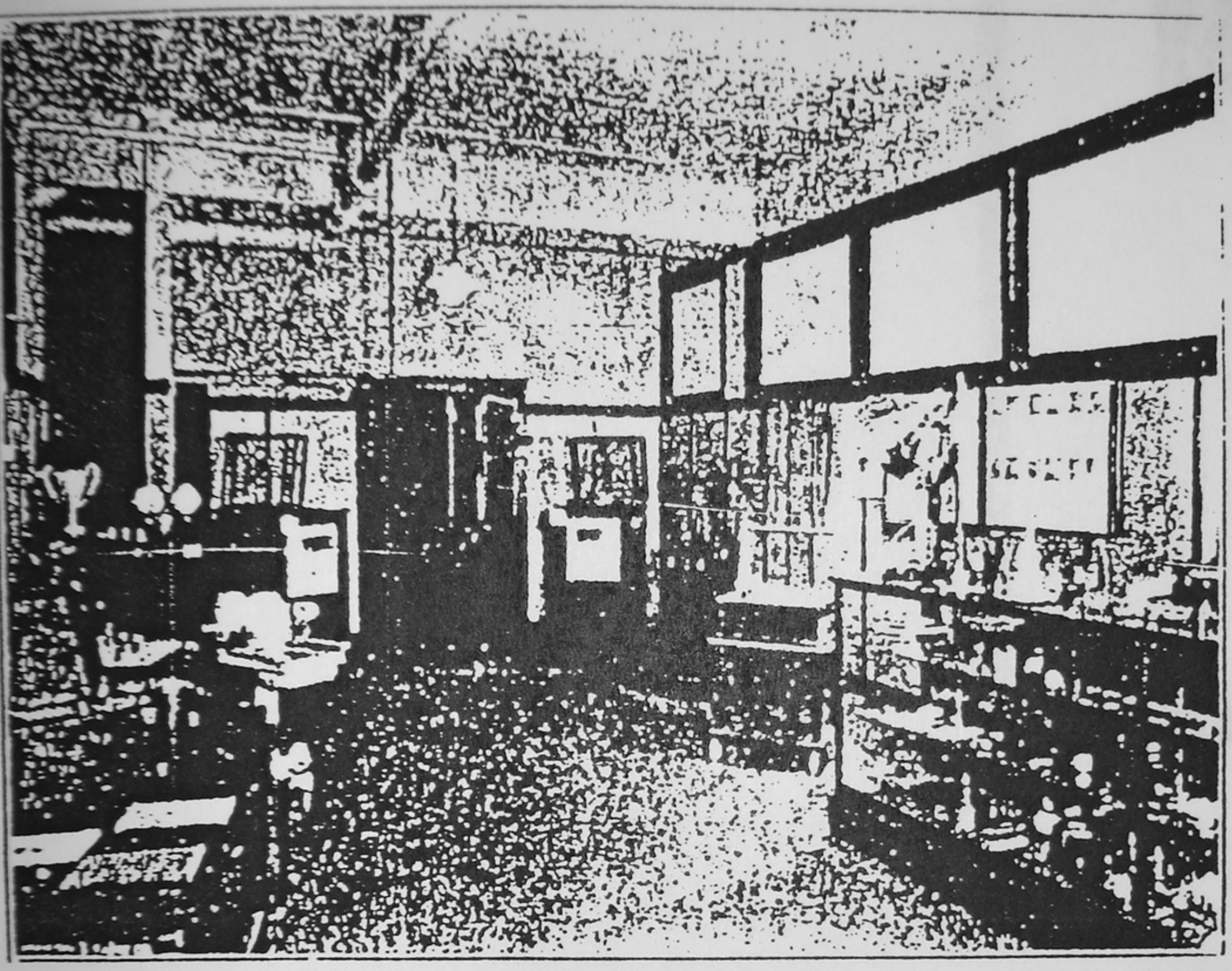


A very important cog in the wheel is our Shipping Department. Meet Mr. Ed. Oberdieck, who presides therein—fat, healthy and smiling.

Well, one needs all three in a crowded shipping room. Only the best of packing materials are used tissue paper, paper cartons and boxes, wooden crates and wooden boxes to insure our goods arriving in perfect condition at destination, whether five miles away or five thousand miles.



The "Fischer" Trucks



We surely must take you through our demonstrating room, where we have completed outfits on exhibition. Here you will see all the very latest machines for electro-physiotherapy work, as well as a most complete line of accessories, and we are always ever-ready to make demonstrations.

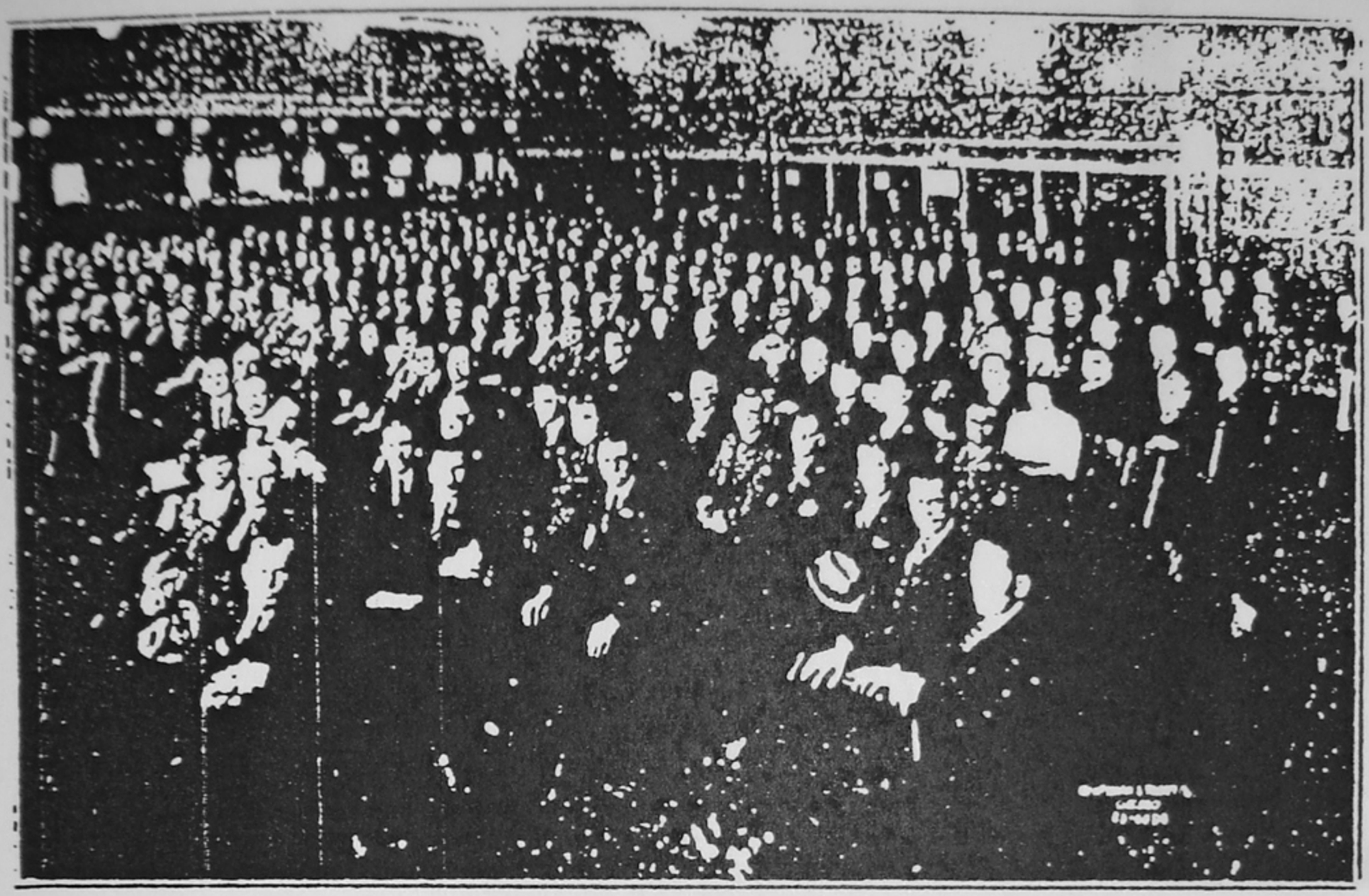
Lectures and clinics are calendared for the second Monday of every month in this room. Over 18,000 invitations are extended each month, and physicians especially talented in particular phases of electrotherapeutic work appear on the program. This service alone is just one of the many sides of the educational work carried on continually by H. G. Fischer & Company, Inc.



Do you recognize any of these folks? They are the officers and most of the sales force of H. G. Fischer & Company, Inc. Photo was made at a recent get-together festival here at Chicago.



Perhaps you will recognize yourself in this photograph, taken at a Fischer Convention in 1921. The Educational Department is ever on the watch for opportunities to help Physicians master Physiotherapy.



Here is a splendidly representative gathering of physicians from 31 of these United States and 3 foreign countries, who attended a recent physicians' meeting at the invitation of H. G. Fischer & Company, Inc., at Chicago.

This illustration shows only about one-half of the almost 700 attendants, who were so pleased with our efforts in promoting the meeting that they presented us with this beautiful Loving Cup, inscribed:

To

H. G. FISCHER & COMPANY, INC.,
in appreciation of their efforts to promote medical efficiency by inaugurating the Physiotherapeutic Meeting in Chicago, October 15 to 19, 1923
from
The Physicians in Attendance





A Fischer Company Picnic

The Employes (or, as they are most often referred to, the "business associates") of H. G. Fischer & Company, Inc., are kept in close touch with conditions through the activities of their Welfare League —consisting of and controlled by themselves entirely.

The Annual Picnic out in the woods, and the periodic receptions and dances are eagerly looked forward to by all. These meetings outside business hours, as well as the many gatherings of the heads of the departments each week, serve to enlighten, strengthen and intensify Fischer Service both inside and outside the factory.

Our Story Was Brief—

Let us add, that *your welfare is our welfare.*

Co-operation is a word that possibly has been overworked to a great extent, but to us it means just this—if we can give you the benefit of our vast manufacturing and experimental experience, extending over a period of twelve years, we are always glad to do so.

Being in constant contact with the physicians who are employing electro-physiotherapy daily, we are able to suggest plans and ideas that will be advantageous to you from many angles.

When in doubt, consult
"The House of Service."

The Fischer Employe's Creed

I believe in the work I am turning out, in the firm I am working for, and in my ability to get results.

I believe that honest work can be handed out by honest methods.

I believe in turning out every bit of my work of such quality that I would be proud of it if I were paying for it myself.

I believe in working, not weeping; in boosting, not knocking; and in the pleasure of my job.

I believe in clean working conditions, and consider it a duty to myself to assist in keeping my department orderly and sanitary.

I believe that a man gets what he goes after, and that one deed done today is worth two deeds tomorrow, and that no man is down and out until he has lost faith in himself.

I believe in today and the work I am doing, in tomorrow and the work I hope to do, and in the reward which the future holds.

I believe that in attempting to pass the buck I would only display ignorance and prove my incapacity.

I believe in preparing myself for advancement so that the firm I work for need not look to outsiders to fill the more important positions.

I believe in courtesy, in kindness, in generosity, in good cheer, in friendship, in open minded criticism and in honest competition.

I believe there is something doing for every man ready to do it.

I believe I'll get ready

RIGHT NOW

Fischer Accessories

H·G· Fischer & Company Inc.

Physiotherapy Headquarters

2333-43 Wabansia Avenue

Chicago, Illinois

H.C. Hansen & Company Ltd.

Established 1884

Chemical Industries

Copenhagen



Hydrolyzed Vegetable Protein

J. Albert Eno

General X-Ray Co.

831 Park Sq. Bldg.

Boston, Mass.

FISCHER

PHYSIOTHERAPEUTIC *and* X-RAY SUPPLIES *and* ACCESSORIES

Catalog No. 16
January 1926

H. G. FISCHER & COMPANY, INC.
Physiotherapy Headquarters
2333-43 Wabansia Avenue
Chicago, Illinois

Form 814

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The FISCHER PLANT

Home of Fischer Quality and Service

Conveniently Accessible
From All Parts of the City

DRIVING—Follow Washington Blvd. to Oakley Blvd., north on Oakley to Wabansia Ave. and one block west, or

BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont, or

BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

Visitors Are Always Welcome!

Foreword

IN presenting this, the 16th edition of our Accessory Catalog, we wish to call special attention to the many additions and changes that have been made. This catalog supersedes all former issues. It shows our full line of accessories, and renders obsolete all former illustrations, prices and description. No prices are given, but periodical price lists are issued to keep step with market fluctuations and the rise and fall of consequent costs.

We believe that our successful growth has been largely due to the rigid policies which we adopted at the outset—up-to-date manufacturing equipment, fair selling prices, guaranteed shipments, an adequate Service Department, and the ever present desire to "play square."

How to Order

Always use a separate sheet on which to write your order, and write it on *one* side only. *Avoid* including it in the wording of your letter. This hastens the correct filling of your order. Use catalog numbers and write plainly, and when ordering by telegraph use *Code* words as they designate to us exactly what is desired, and save you expense in the message as well.

State clearly whether your machine is to be operated on the Direct or Alternating Current. If on D. C., give Voltage; if on Alternating, give Voltage and Cycle. Obtain this information from a reliable source: preferably from your electric power station.

When order does not give shipping instructions we will send via the cheapest or most direct route. Articles of light weight will be sent by Parcel Post to expedite delivery wherever possible.

Damage to Goods in Transit

Our responsibility ceases when goods are receipted for by the express freight carrier, agent or Post Office, and we cannot be held responsible for breakage during transit, and if claim has to be filed for damaged goods, such claim should be filed by the consignee against the Transportation Company.

Return of goods by parcel post should always be insured so the shipper is protected in case parcels are lost.

As soon as it is found that goods are received in a damaged condition the carrier's agent should at once be notified and have the damaged goods inspected.

Neglect in complying with this rule places the responsibility entirely with the consignee in case claim is refused.

Guarantee Any defects in our apparatus that may develop within six (6) months from date of shipment under normal and proper use, due to faulty material, imperfect insulation, or careless workmanship, will be repaired or replaced at our option and our expense, provided such apparatus is delivered *prepaid* to our factory.

For repairs or replacements during the next twelve (12) months, we will charge only actual cost to cover, and after this period our service and our attention are to be called on when required, with the understanding that charges for overhauling "Fischer" apparatus will always remain as near actual cost as possible. We do not maintain a repair department for profit—this department is entirely for your service.

We will not assume any liability for work done by others, without our consent in writing, nor for defects from improper storage.

We will not assume any liability for breakage of glassware, lamps, or X-ray plates, nor for deterioration of rubber goods, X-ray films or any perishable goods. We can but use the best materials obtainable.

Rotary converters, meters, and motors not manufactured by us, do not carry our guarantee, but are backed up by the guarantee of the makers.

Return of Merchandise Crediting for return of goods ordered in error or on account of dissatisfaction on receipt has become a serious factor of expense, and is a problem difficult of solution. In justice to our customers, and to ourselves we have adopted the following, governing such returns:

No merchandise will be returnable for credit after having been in customer's possession fifteen (15) days or more.

No merchandise will be returnable for credit except upon written request of purchaser, and then only with our consent.

All merchandise must be returned *prepaid*.

No merchandise will be accepted unless returned in salable condition.

All merchandise returned, whether for repairs or for credit, must be carefully packed, and all goods over a $2.00 valuation should be insured.

Cabinets or Portables returned for repairs or overhauling should be stripped of all accessories, unless such accessories are also to be gone over. Loose accessories always mean danger or further damage to your equipment in shipping. We cannot be held responsible for breakage or damages due to improper packing.

And last, but very important nevertheless, *never* fail to place *your name and address in and on* the box or parcel when shipping to us.

Prices All prices are figured F. O. B. Chicago. The prices on all our goods are as low as it is possible to make them and still be consistent with the quality of the materials and high grade of workmanship used in their construction.

All orders for $1.00 or under should be accompanied with stamps, money order or check.

Our minimum billing for goods shipped is 50c.

Our prices are subject to change without notice.

Terms A discount of 5% will be allowed when cash accompanies retail orders. Retail purchasers having an established credit with us may discount their bills in ten days, or they will be considered net and due in thirty days.

Our goods are also sold on the deferred payment plan, at list prices. We shall be glad to make quotations to reliable parties, and ask that you write us if interested.

New Accounts We earnestly solicit new accounts, but purchasers will appreciate the necessity of supplying satisfactory references. The name of the bank carrying your account, or some Chicago firm with which you have transacted former business, is usually sufficient.

NOTICE!

Illustrations herewith are not binding as to detail, in view of constant improvements, and the goods supplied you may differ slightly in appearance. However, when your order is received, the very latest model will always be forwarded.

SPECIAL SERVICES FOR PHYSICIANS AND SURGEONS

In the interest of physiotherapeutic progress, H. G. Fischer and Company for years have sponsored a number of special services to physicians and surgeons. Lectures, clinics and conventions, conducted by recognized authorities in the field, are held at frequent intervals under our auspices. Reports, reprints, brochures, booklets, books and a monthly magazine are published. Among these various services the following are worthy of special mention:

Monthly Lecture-Clinics. In charge of various well-known physiotherapeutists. Held at the Fischer Company's building, the second Monday of each month. Physicians and surgeons are invited to attend these meetings without fee or obligation.

Fischer's Magazine. A digest of current physiotherapeutic news, lectures, papers and case reports, published monthly. Any physician or surgeon will be put on the mailing list, on application, free of charge.

Pamphlets, Brochures and Reprints. These are constantly being published, covering subjects throughout the entire field of physiotherapy. Treatises on any specified subject will be mailed free to any physician or surgeon on request.

Books on Physiotherapeutic Subjects. The latest literature of physiotherapy, by nationally known authorities, is always available here. Send your order and we will deliver the book at regular publication price.

Booklets and Catalogs, covering the various types of physiotherapeutic treatments and apparatus, are available. Physicians and surgeons desiring information on Diathermy Outfits, Quartz Lamps, Radiant Lamps, X-Ray Apparatus, Morse Wave Generators, or any other physiotherapeutic apparatus, are invited to correspond with us.

Whatever may be the information you desire on any physiotherapeutic subject, prompt attention may be had by addressing your inquiry to

Educational Department
H. G. FISCHER & CO., Inc.
Physiotherapy Headquarters
2333 Wabansia Avenue **Chicago, Illinois**

The New Fischer Flexible Mesh Electrodes

(Pat. Applied For)

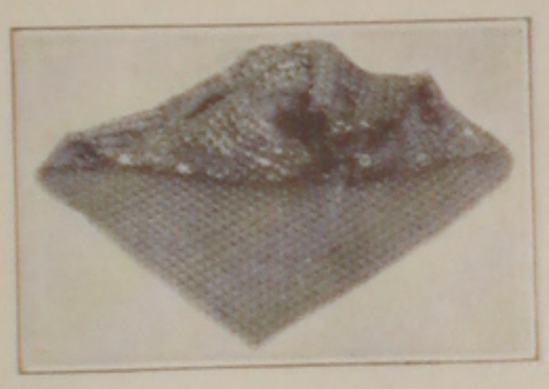
The most flexible and convenient ALL-METAL electrode ever designed.

Fits any part of the body like a glove, regardless of shape or contour.

May be applied with Diathermy, Electro-coagulation, D'Arsonval Auto-condensation, Sinusoidal, or any other Electrical modality where perfect contact on the skin is necessary.



Application Mesh Electrode



A Mesh Electrode



Section of Electrode, Showing Exact Size of Links

Composed of a series of flat links of German silver, they are flexible, practically indestructible, easily sterilized, and form an almost continual flat surface to be applied to the skin.

Endorsed by physiotherapists everywhere.

Especially valuable for use on uneven surfaces where solid electrodes cannot be effectively employed—on the knee, elbow, wrist, hand, spine, over the shoulder, in fact wherever it is impossible to make perfect contact with any other means.

Stocked in the following sizes:

No.		Code
845	4″x 6″	*Samar*
847	6″x 6″	*Samil*
848	6″x 8″	*Samme*
846	8″x 8″	*Sambo*
849	8″x10″	*Samot*
850	10″x12″	*Sampa*

Or we can furnish as follows:

No.		Code
843	3″ wide	*Sabbot*
844	6″ wide	*Safrol*
870	8″ wide	*Sagger*
871	10″ wide	*Sagums*
872	12″ wide	*Sailer*

(Will be cut to any lengths, to order. A cutting charge of 15c will be added for special lengths under 10 inches.)

Can be folded to cover any area.

Cuff Method Diathermy Application

For employing the "Cuff Method" of applying diathermy to the limbs and joints, every physician should have at least one pair of Mesh Electrode Cuffs. These are strips of German Silver Mesh, 3 inches wide and from 12 to 24 inches long, with an arrangement fastened to one end for holding the elastic bandage. Very convenient and handy, and once used will be found indispensable.



No.		Code
900	Mesh Cuff and Clamp—3″x12″	*Nephew*
901	Mesh Cuff and Clamp—3″x16″	*Neptun*
902	Mesh Cuff and Clamp—3″x20″	*Nereid*
903	Mesh Cuff and Clamp—3″x24″	*Neroli*

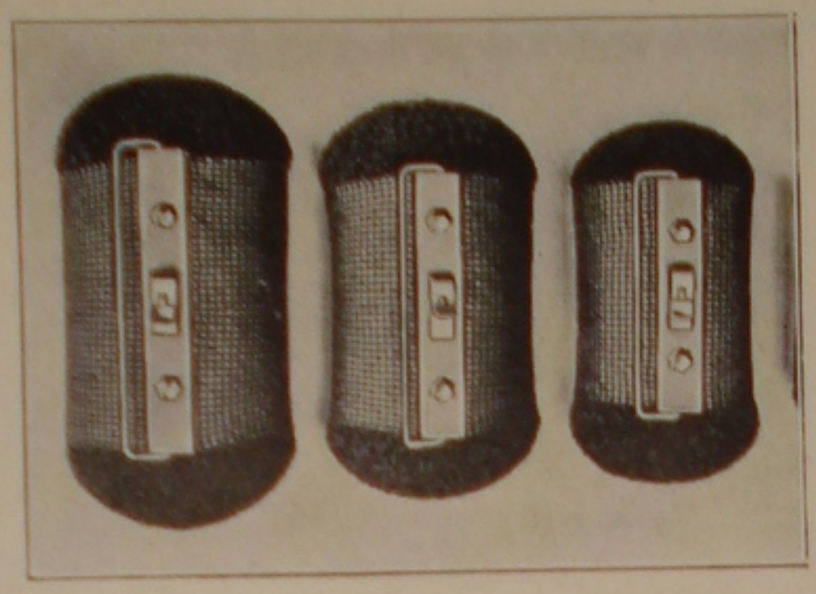


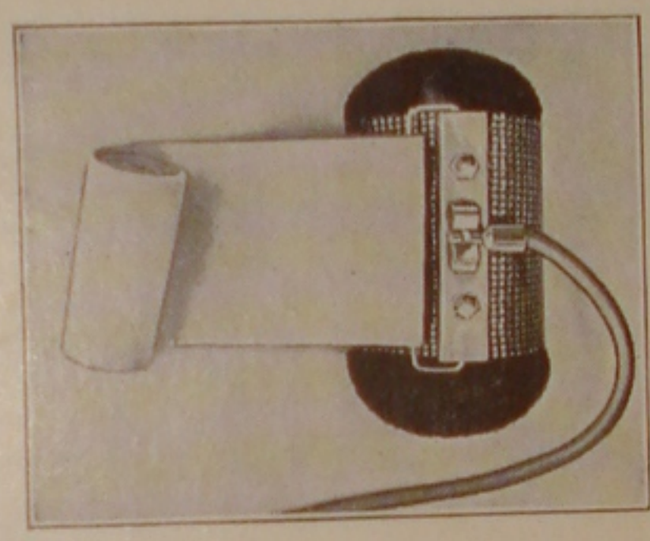
Sponge Pad Electrode

Lay this pad in your tray or pan of salt water, and your patient will not complain of hot spots when placing hand or foot down for contact.

No.		Code
886		*Nether*

Mesh Electrodes With Sponge Rubber Pads





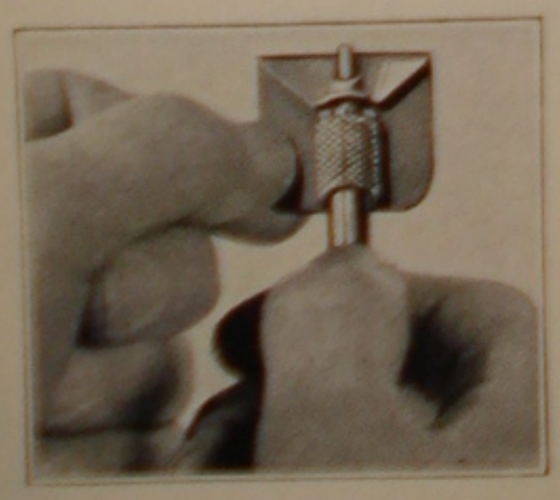
These combinations are the direct result of numerous suggestions that they would be very adaptable; already they have more than fulfilled expectations.

The Sponge Rubber padding may be washed and always kept clean. It is very soft, and conforms well to any uneven surface. The elastic bandage is entirely removable. Stocked in five sizes:

No.		Code
891	Sponge Mesh Electrode—3 "x3½"	*Nemean*
893	Sponge Mesh Electrode—4 "x4½"	*Neogae*
894	Sponge Mesh Electrode—4½"x5 "	*Neolgy*

(Bandage not furnished with pads)

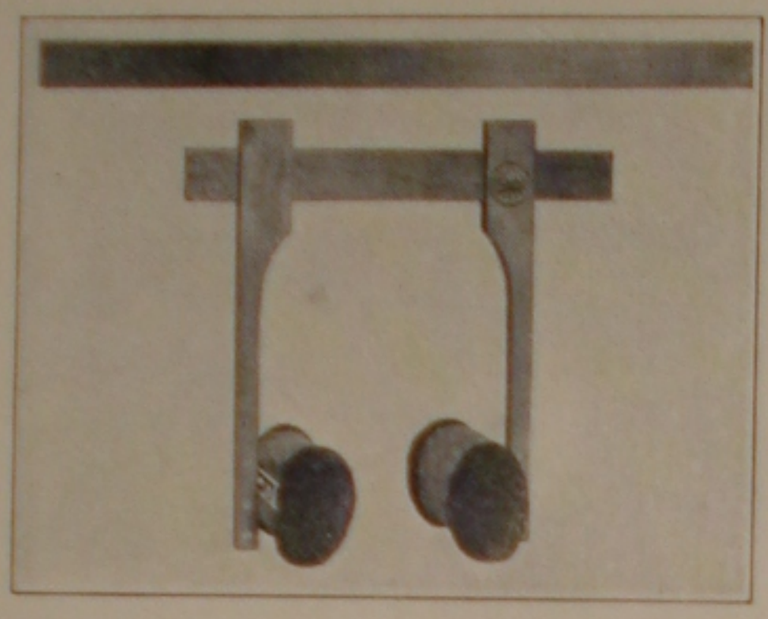
Metal Connector For Mesh Electrodes

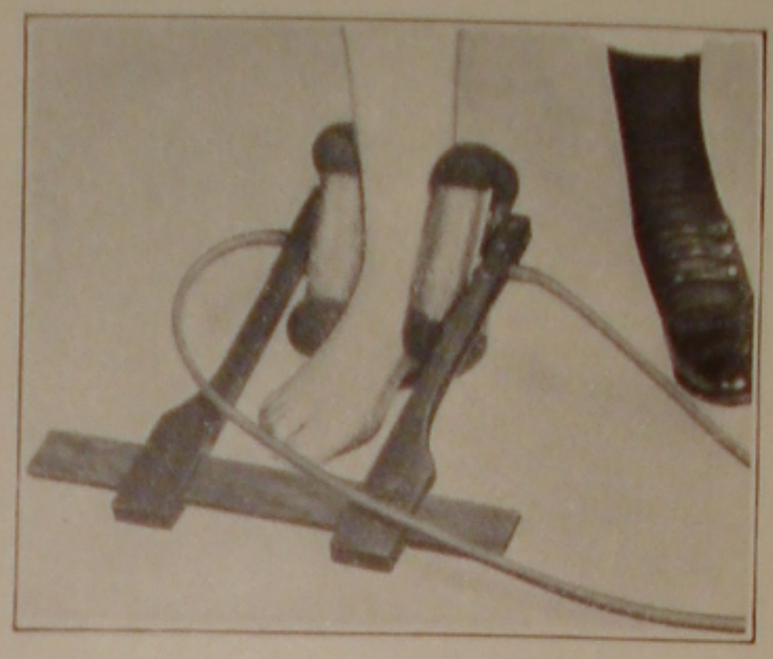


A simple device to fit the No. 1330 Fischer Diathermy Cords. Made of spring brass, heavily nickel-plated. Cord tip cannot come loose when once snapped in place. The contact is flat, but there are several small teeth protruding for engaging the surface of the electrode to prevent slipping. On the limbs this device should be held in place with our No. 854 Elastic Bandage; on the body, with a sandbag.

No.		Code
851	Metal Connector	*Mescon*

The Universal Diathermy Clamp Electrode



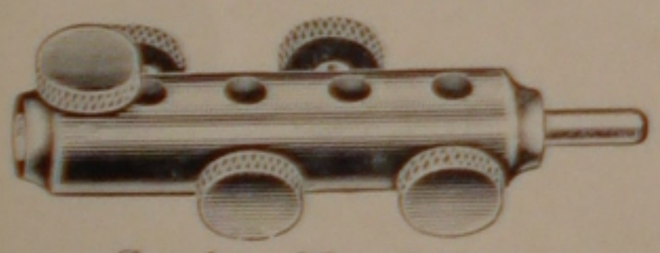


Applied and removed in an instant—may be used on practically any part of the body. All of the various sponge mesh electrodes described on page 9 are interchangeable on this device.

No.		Code
930	The Universal Diathermy Clamp electrode	*Uclamp*

Fischer Multiple Cord Connector

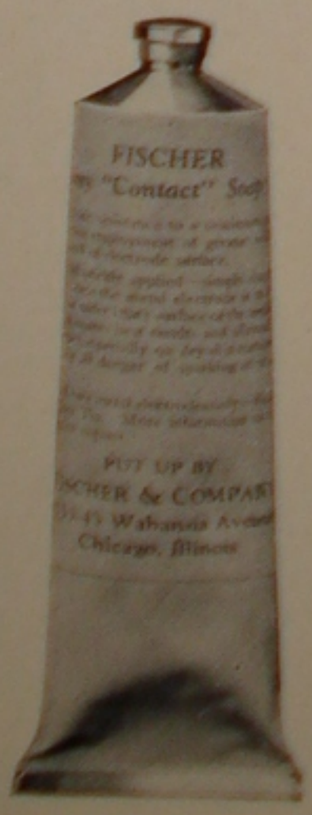
Used when two, three or even four cord connections are desirable from one terminal.



Catalog No. 865

The small end tip is fastened into the proper binding post on your machine, and you may carry as many cords from it as desired.

No.		Code
865	Multiple Connector 5-Wire	*Sable*
866	Multiple Connector 3-Wire	*Sabin*

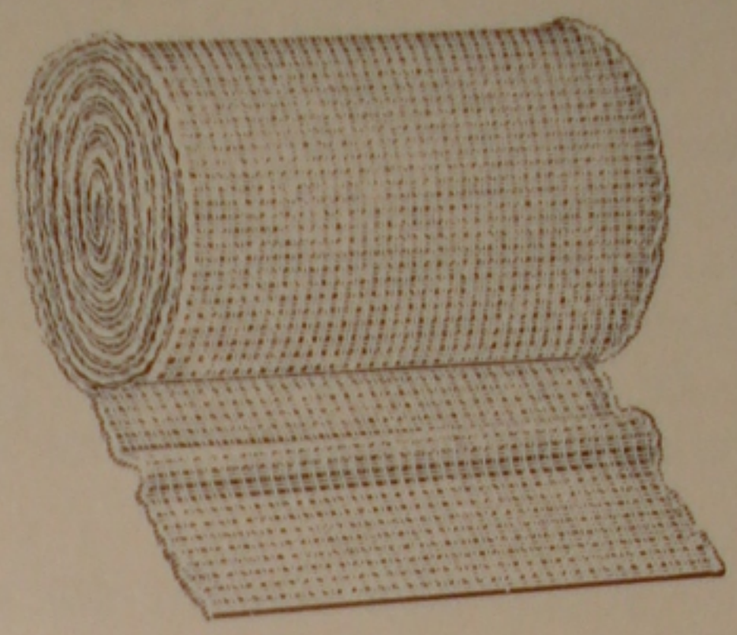


Diathermy Soap Lather Paste

Convenient, always ready.

No.		Code
875	In handy collapsible tube	*Ditube*
876	In 10 oz. tube	*Diasop*

Elastic Bandage

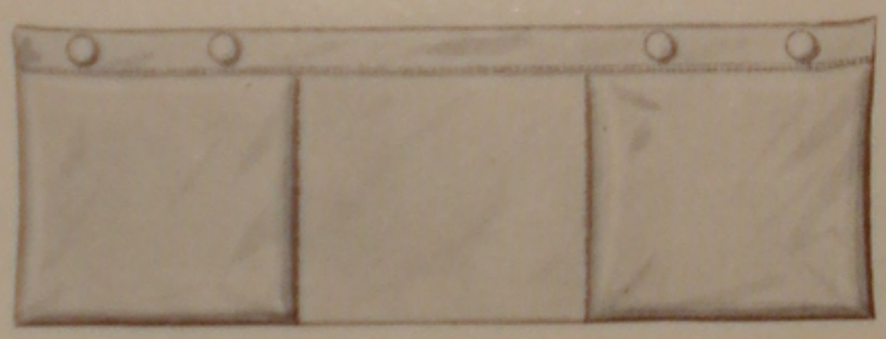


Employing Elastic Bandage is the only known method of binding Diathermy Electrodes to the limbs, which will permit the patient to move if necessary for the sake of comfort without the electrode shifting.

These Bandages may be washed, and always kept sanitary.

No.		Code
854	3-inch width—yard	*Elband*
856	2-inch width—yard	*Vanire*

Sandbags

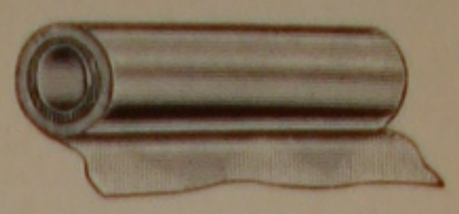


Made of tough canvas fabric. The end, or sand pockets are of the same size and capacity regardless of the length of the whole, and are about half filled with sand. This leaves the assembly very flexible and adaptable.

When the bag is placed over the patient the flat band only bears on the electrode—the weights hang down at the sides. The longer pads are made to hang over the side of the treatment table or cot.

No.		Code
880	5″ wide by 15″ long	*Nestor*
881	5″ wide by 25″ long	*Sanbag*
882	5″ wide by 36″ long	*Neting*
883	5″ wide by 45″ long	*Sannes*
884	5″ wide by 60″ long	*Neubag*

Sheet Block Tin



Sheet Block Tin, made specially flexible for use as Diathermy Electrodes, 12 inches wide, and in two thicknesses: .010 and .018 inch.

This is something entirely new in sheet electrode material, composed of a center of very flexible alloy with a sheet of *pure tin* on each side. Electrotherapeutists will appreciate the fact that *pure tin* is placed in contact with the skin in preference to the lead ordinarily supplied. It is easily cut with scissors.

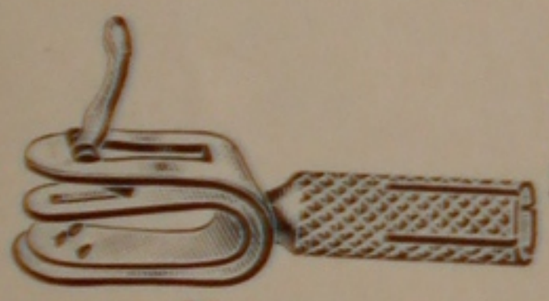
It is readily cut. Approximately one square foot of the .018 material, or two square feet of the .010 inch thickness, equals one pound.

Keep the Roller on which this Material is Packed!

You will find it of extreme value each day for rolling smooth the Block Tin electrodes between applications.

No.		Code
840	Pound—.010 thick	*Nessus*
841	Pound—.018 thick	*Nestle*

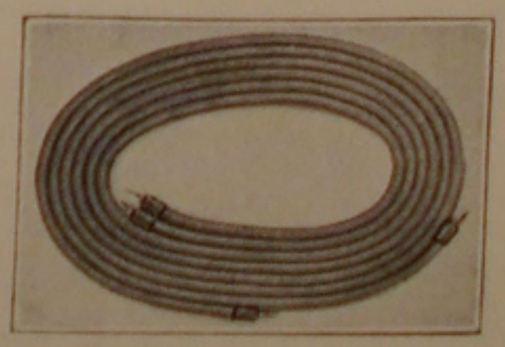
Electrode Clips



No. 868
Mesh Electrode Clamp

No.		Code
868	Block Tin or Mesh Electrode Clamp	*Nettle*
852	The "Fahnstock" Clip	*Facon*

New Fischer Diathermy Cords



Diathermy Cords are constantly getting wet, and when covered with a mercerized or silk webbing they are usually stained and discolored after but a few days' use.

Here are our much improved Diathermy Cords, covered only with pure gum rubber. They are very flexible, easily kept as clean as when new, and constructed to give long service.

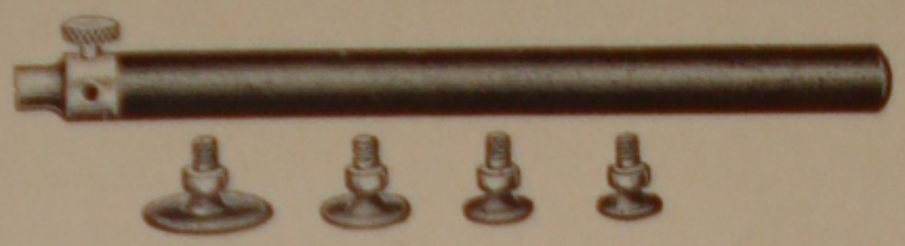
No.		Code
1330	6 foot pair	*Negro*

Note: When ordering these cords for the Fischer Senior "FO," "LO," "G" or "GP" Diathermy Outfits, specify No. 1330-G, which are supplied with special tips.

Disc Diathermy Electrodes

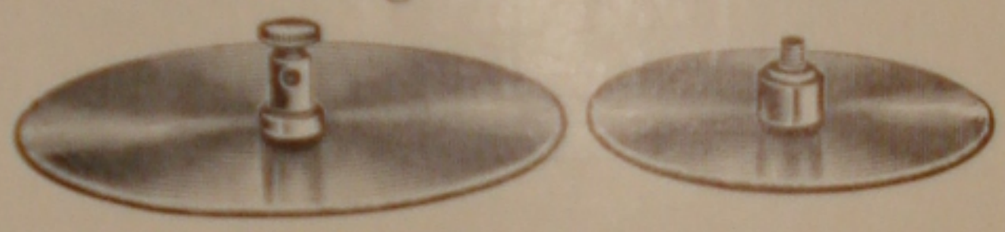
For the application of the Diathermy High Frequency Current. Discs are made of $\frac{1}{16}$ inch sheet brass, heavily Nickel-plated. Discs Nos. 606, 609, 625, 626, 627 and 628 are interchangeable on the same set of rubber handles. No handles are necessary with Nos. 610 and 611.

Small Size Discs



No.		Code
625	Diathermy Disc— 3/8″ diameter	*Velour*
626	Diathermy Disc— 1/2″ diameter	*Velvet*
627	Diathermy Disc— 3/4″ diameter	*Vendee*
628	Diathermy Disc—1 ″ diameter	*Vendou*
630	Complete set of four above discs and handle	*Veneer*

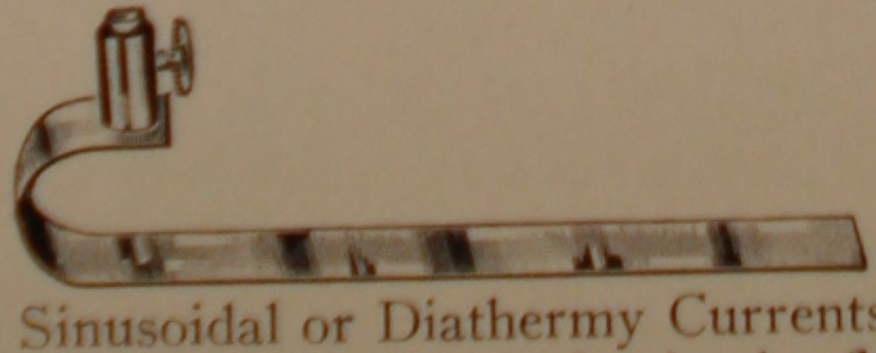
Large Size Discs





No.		Code
606	Diathermy Disc—2″ diameter	*Jaw*
609	Diathermy Disc—3″ diameter	*Graft*
610	Diathermy Disc—4″ diameter	*Grain*
611	Diathermy Disc—5″ diameter	*Gurgl*
606R	Rubber Handle	*Jecur*

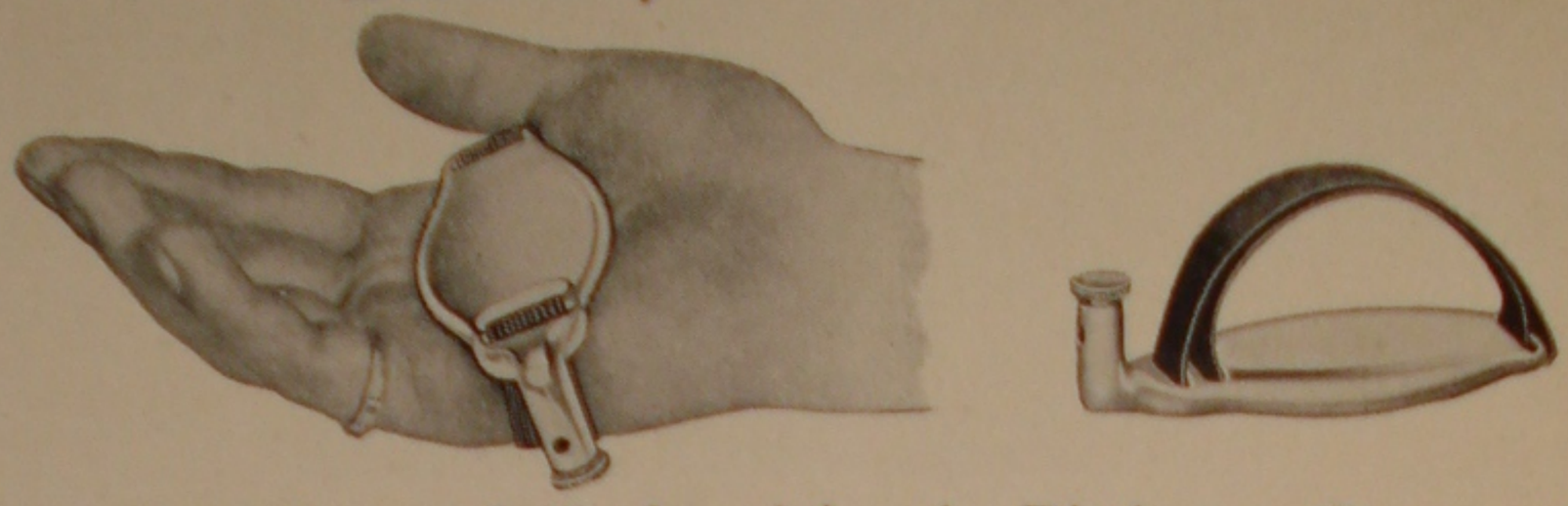
Liquid Bath Connector



For carrying the Sinusoidal or Diathermy Currents to water in trays, for treating the limbs. Connector lays flat in the fluid, and wire connection is made to binding post.

No.		Code
618	Liquid Bath Connector	*Gleam*

Diathermy Hand Electrode



A most convenient method of applying the Diathermy Current by the hand, for local treatments. The rubber band holds the plate in close contact with the palm of the hand, and allows a free movement of the fingers for massage purposes. Carefully designed; all edges smoothly rounded and polished, making it an ideal and extremely convenient appliance.

No.		Code
614	Hand Electrode	*Grace*

Flexible Pad Electrodes

A flexible, Felt Pad, backed with pure block tin. Can be adapted to most any shape. Has connection on back for fastening wire from machine.

No.		Code
613	Felt Pad Electrode—8″—Round	*Giddy*
690	Felt Pad Electrode—3″x6″	*Lasher*

Pad electrodes of odd sizes and shapes, made to order. Write us your requirements.

A "Finger Rheostat" Fulguration Device

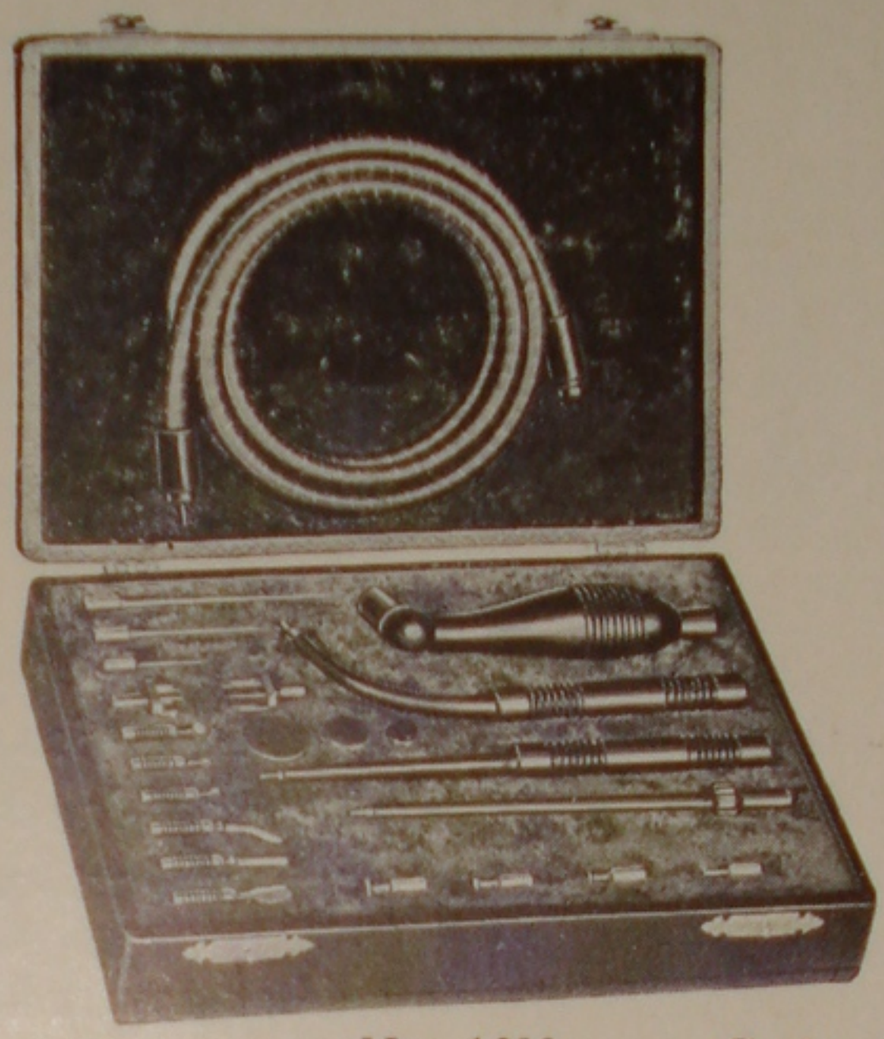


An innovation for the application of Fulguration Current via the indirect method. An insulated control is strapped to the left hand, enabling the operator to draw more or less current from the patient, at will, during the treatment. In the right hand is held the insulated handle and fulguration point. A finger rest is also provided.

No.		Code
860		*Safly*

Surgical Diathermy Electrodes

The electrodes are made of a hard alloy, heavily *gold* plated, and the handles of hard rubber, highly polished.

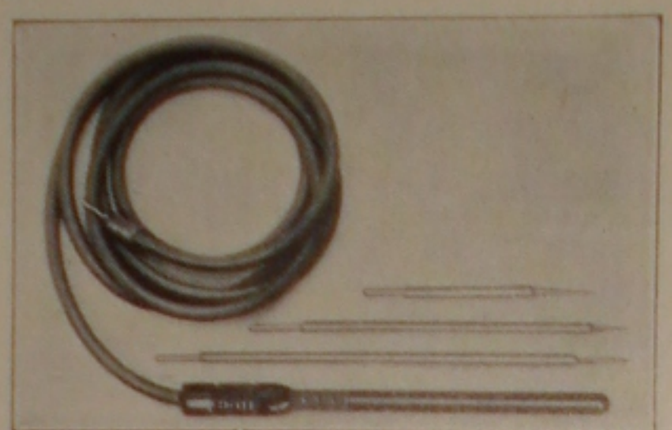


No. 1300

No.		Code
1300	Complete set Gold Plated Surgical Diathermy Electrodes, with protected Cord and rubber Handles, as illustrated, in plush lined leatherette-covered Case	*Macabe*
1301	Case, only, for set Surgical Diathermy Electrodes	*Macaco*
1302	Pharyngeal Electrode Handle	*Macard*
1303	Pharyngeal Electrode Holder	*Macaaw*
1304	Curved Handle	*Macduf*
1305	Straight Handle	*Machet*
1306	High Tension Cable—6′ length	*Macerl*
1307	Single Needle Electrode (short)	*Mackle*
1308	Single Needle Electrode (medium)	*Macron*
1309	Single Needle Electrode (long)	*Macula*
1310	Multiple Needle Electrode (short)	*Madcap*
1311	Mutliple Needle Electrode (long)	*Madder*
1312	Knife Electrode (Cumberbatch)	*Madera*
1313	Blunt Knife Electrode (curved)	*Madona*
1314	Blunt Knife Electrode (straight)	*Madras*
1315	Button Electrode (small)	*Maffia*
1316	Button Electrode (medium)	*Magian*
1317	Button Electrode (large)	*Magucy*
1318	Disc Electrode—1/8″ diameter	*Mahout*
1319	Disc Electrode—3/16″ diameter	*Maigre*
1320	Disc Electrode—1/4″ diameter	*Mainor*
1321	Disc Electrode—3/8″ diameter	*Majuba*
1322	Disc Electrode—1/2″ diameter	*Malaga*
1323	Disc Electrode—3/4″ diameter	*Malice*
1324	Disc Electrode— 1″ diameter	*Malign*

For Prices see List Attached

A New Surgical Diathermy Electrode



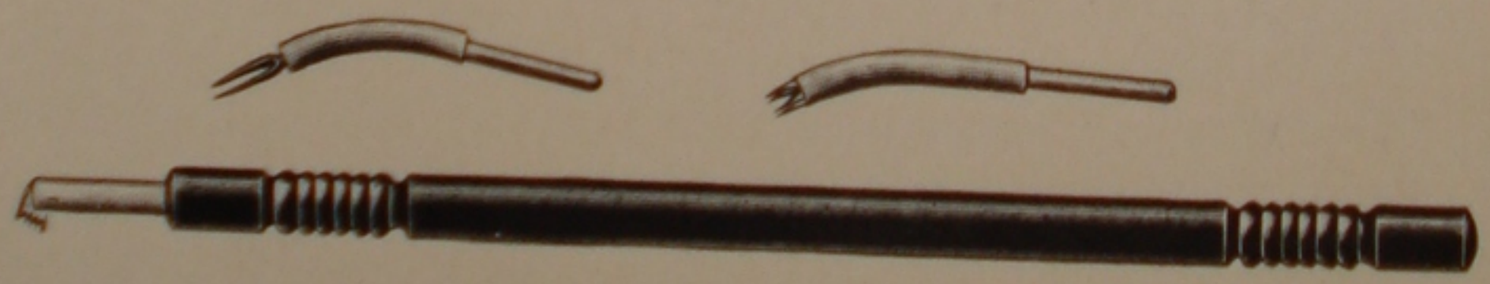
Suggested by Dr. T. Howard Plank for Electrocoagulation operations—especially tonsillectomies. It is small, very light in weight and exceptionally handy for this work. The operator's hands are out of the line of his vision, entirely, when making the application.

A very flexible rubber covered cable is securely fastened directly into the polished hard rubber handle, and is sufficiently insulated that it may be wound around the hand and arm, or allowed to lay against the face of the patient with absolutely no danger of shocking.

There is no exposed metal anywhere with the exception of the active tip. Three tips of different lengths are furnished as illustrated.

No.		Code
862		*Sally*

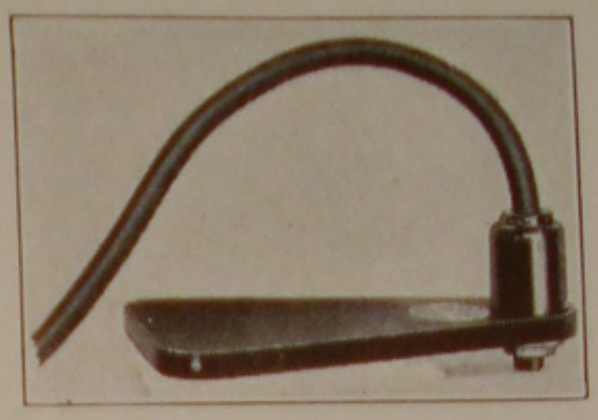
The Thometz Tonsil Electrodes



No.		Code
910	Thometz Electrodes (set of 3)	*Thoset*
911	Retractor and Handle	*Thoret*
912	4-Prong Electrode	*Thofor*
913	2-Prong Fork Electrode	*Thotwo*

(The No. 862 Plank Handle must be used to hold Nos. 912 and 913.)

The Fischer Electrocoagulation Foot Switch



Catalog No. 1205

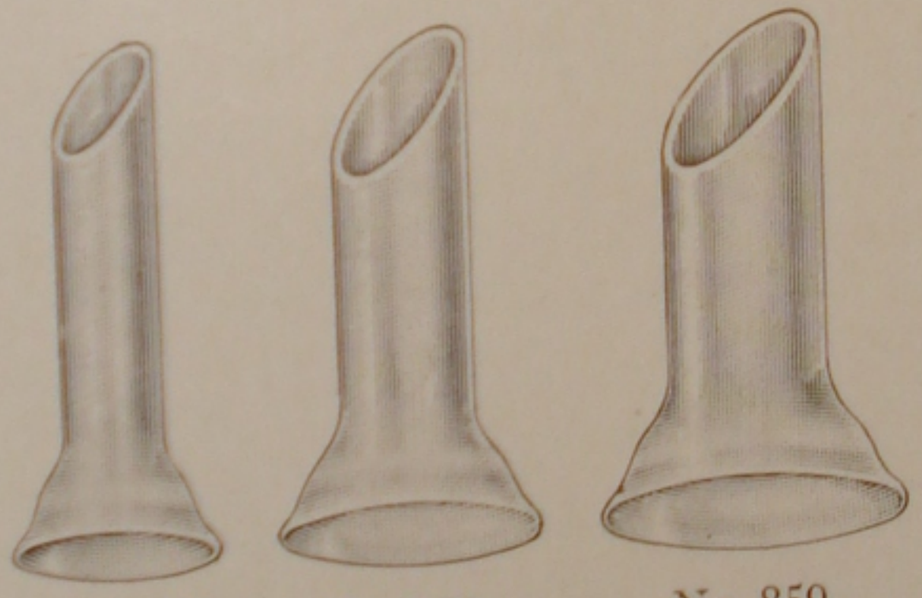
As illustrated, this Foot Switch lays close on the floor. A touch of the toe makes and breaks the contact.

Sufficient insulation has been used to make it shock proof. It is light in weight, easily moved about, yet keeps an upright position on the floor.

The cable is very flexible, and covered with pure gum rubber; it may be washed and kept as new always. Cable terminals will be furnished to fit any style apparatus; specify machine used, when ordering.

No.		Code
1205	Fischer Electrocoagulation Foot Switch, with 8-foot cable	*Thales*
1206	Extra rubber covered cable	*Tiberi*

Glass Rectal and Vaginal Specula



No. 857 No. 858 No. 859

For use in connection with electrical applications (Diathermy, High Frequency, Galvanism, etc.) in the rectum and vagina.

These specula are made in three standard sizes:

No.		Code
857	22 mm. diameter	*Sabot*
858	30 mm. diameter	*Saber*
859	40 mm. diameter	*Sacre*

Special sizes and shapes can be built to order.

Autocondensation Couch Cushion

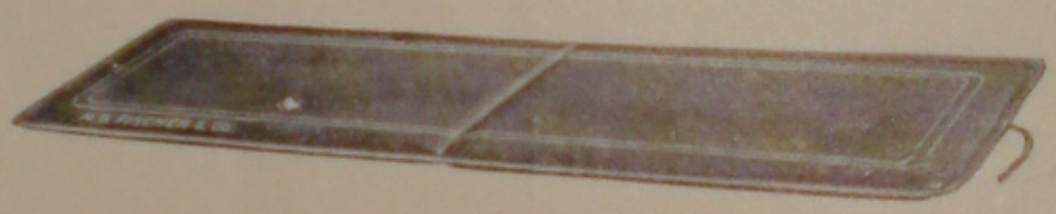


The Fischer Couch Cushion is made of sea moss covered with black DuPont Fabrikoid material with an electrode of zinc.

The Fischer cushion is fully two and one-half inches thick. Size over all, 22 inches wide and 62 inches long.

No.		Code
420	Auto Couch Cushion	*Caffea*

Autocondensation Couch Pad



A well made pad of black DuPont Fabrikoid material, measuring 22 inches wide by 62 inches long. The insulating material between the patient and the center electrode plate is oiled silk and wool felt. The entire pad is about ¾-inch thick, and is designed for machines of medium voltage d'Arsonval output, as for example the Fischer Type "G" Diathermy Outfit.

No.		Code
418		*Cadogg*

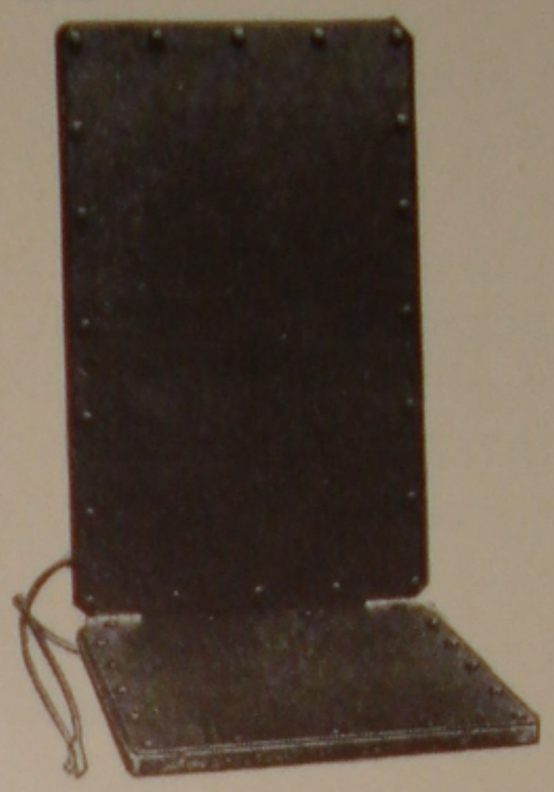
Special G. U. Auto Pad



An autocondensation pad of precisely the same dimensions as catalog No. 418 but split as illustrated. This style of pad was originally designed and used by Dr. B. C. Corbus in his G. U. diathermy work.

No.		Code
416	Corbus Auto Pad	*Corpad*

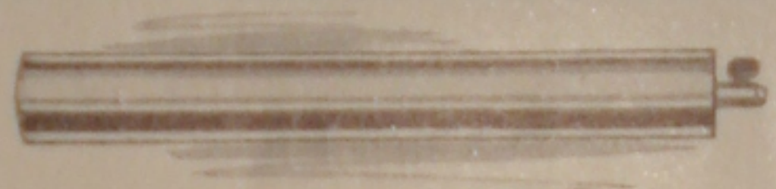
Autocondensation Chair Pad



Frame made of five-ply veneered oak. On one side is mounted a layer of conducting metal covered with a dielectric of one-eighth inch black sheet fiber. Pad is made in two sections to conform to the shape of an ordinary chair. Parts are hinged together to be used on a table should the operator prefer that position. Designed for machines limited to fairly low voltage d'Arsonval output.

No.		Code
410	Chair Pad	*Cado*

Autocondensation Handles



No. 52



No. 58

No.		Code
52	Handle 1″ Diameter by 9″ long	*Carota*
58	Handle 1½″ Diameter by 16″ long	*Authan*

Wooden Treatment Table

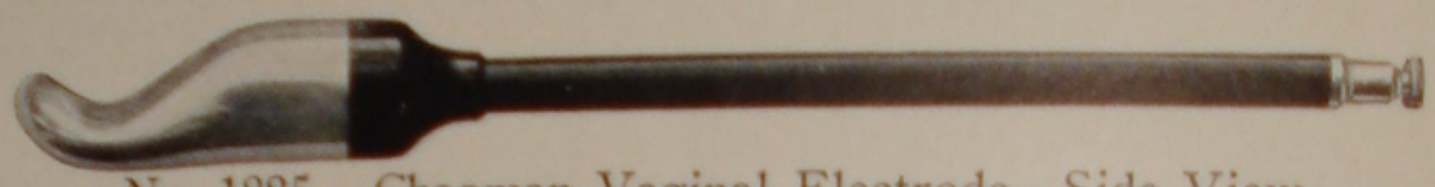


A solid, well made treatment table of all-wood construction, finished in mahogany. Has compartment under the top for storing the autocondensation pad when not in use.

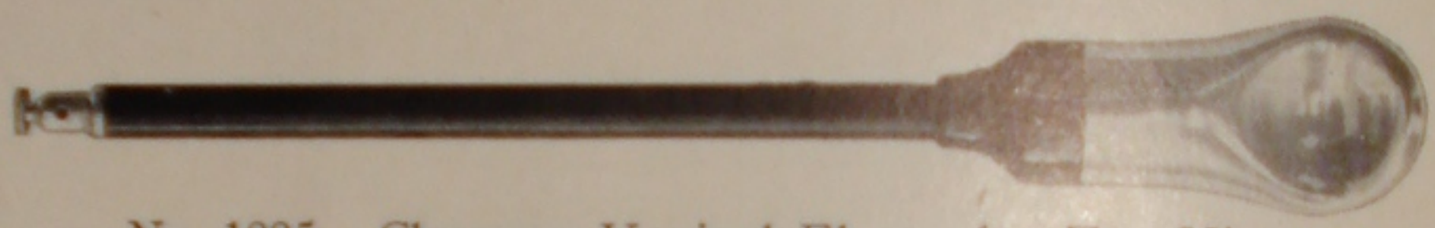
No.	Code
422	*Tettat*

The Chapman Vaginal Electrode

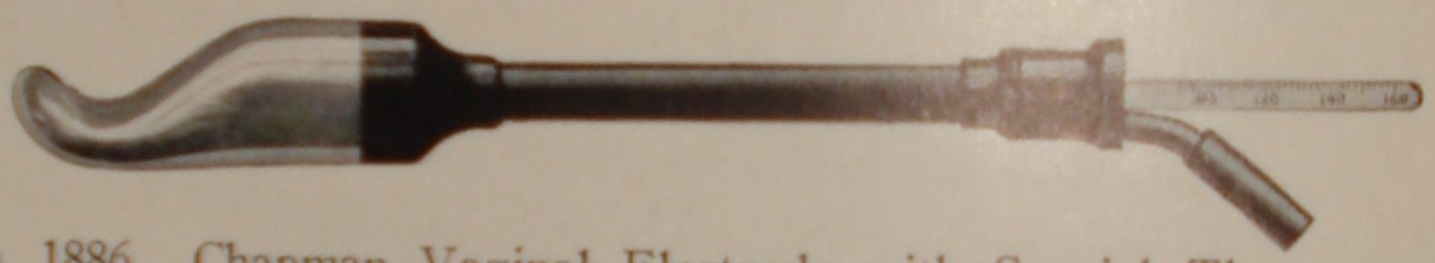
Designed along scientific lines, with size and shape of polished metal end to properly engage the lips of the cervix. The shank, or handle, is made of hard rubber. This electrode is to be used with Diathermy Current. Supplied both with and without the special thermometer which permits the accurate maintenance of an exact temperature within the vagina. This instrument is of extreme value in the treatment by diathermy of painful or inflammatory conditions of the female pelvis.



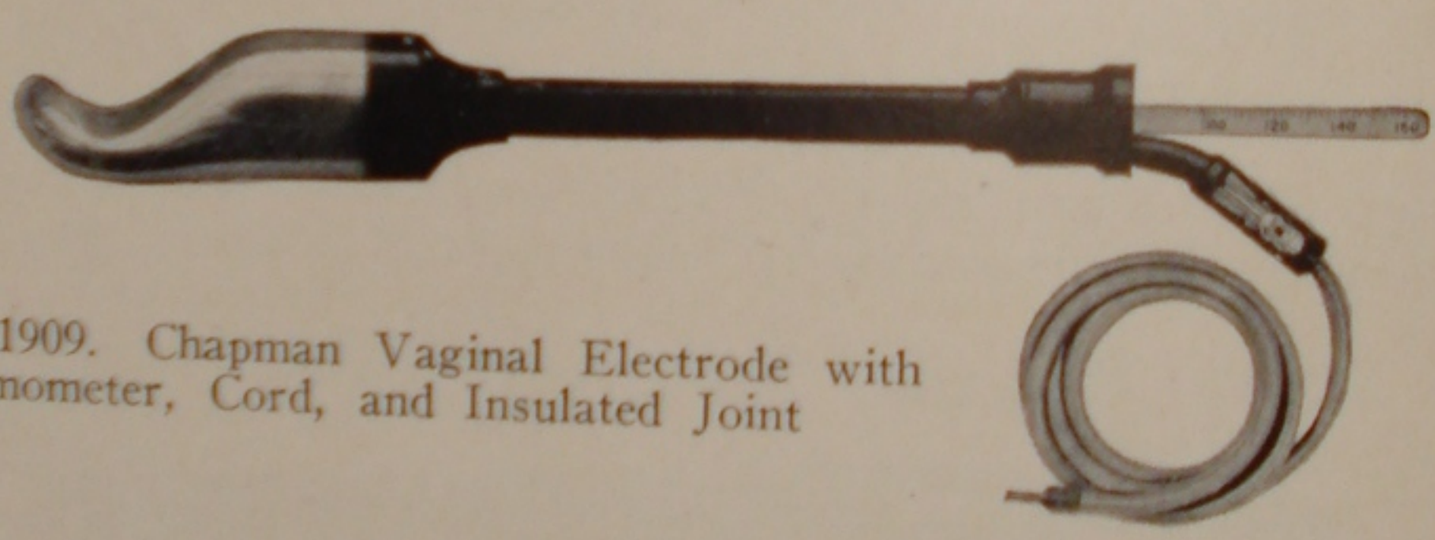
No. 1885. Chapman Vaginal Electrode—Side View



No. 1885. Chapman Vaginal Electrode—Top View



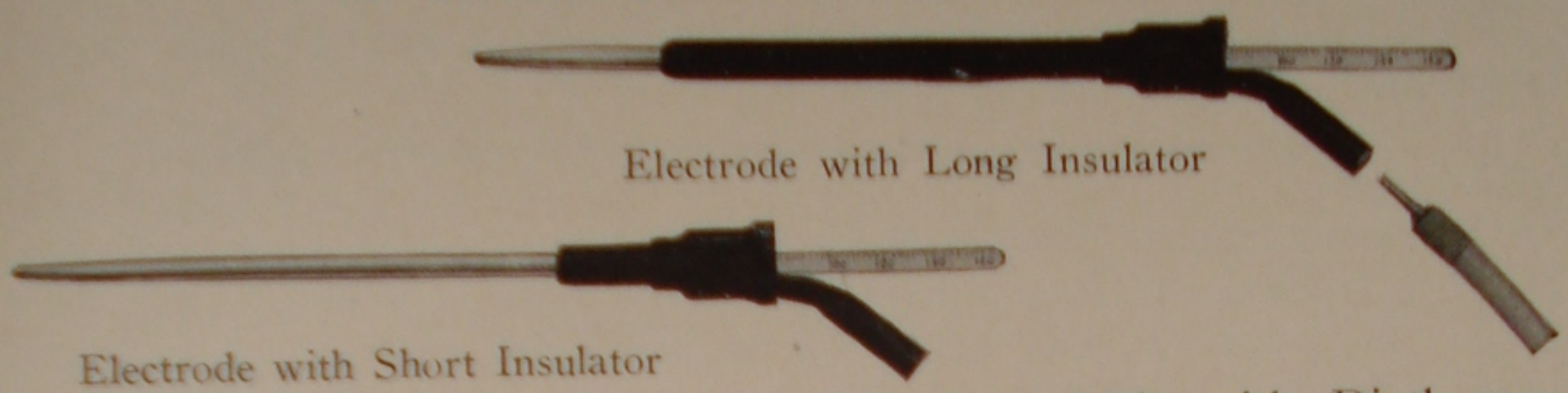
No. 1886. Chapman Vaginal Electrode with Special Thermometer



No. 1909. Chapman Vaginal Electrode with Thermometer, Cord, and Insulated Joint

No.		Code
1886	Regulation size, with thermometer. Shank $1\frac{3}{16}$" diameter, cervical bowl $1\frac{3}{4}$" wide and $\frac{3}{8}$" thick. Handle of hard rubber	
1885	Without thermometer	*Chavac*
1884	Small size, with thermometer. Shank $\frac{15}{16}$" diameter, cervical bowl $1\frac{7}{16}$" wide, $\frac{5}{16}$" thick. Hard rubber handle	*Chapel*
1883	Without thermometer	*Chasma*
1909	Regulation size, as No. 1886, with thermometer and with cord and insulated joint	*Chalit*
1908	As No. 1909, without thermometer	*Vermin*
1907	Small size, as No. 1884, with thermometer and with cord and insulated joint	*Vermel*
1906	As No. 1907, without thermometer	*Verity*
		Verdur

The Corbus Endocervicitis Electrode



Electrode with Long Insulator

Electrode with Short Insulator

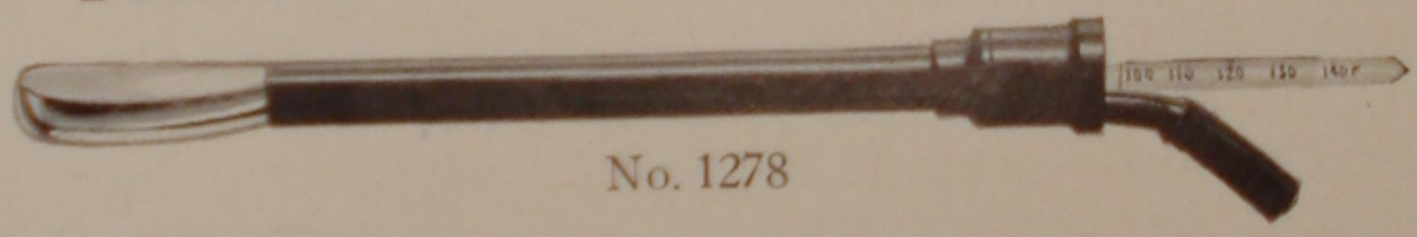
For the treatment of Gonorrheal Endocervicitis with Diathermy. Thermometer registers degree of heating obtained, Fahrenheit. Instrument consists of four pieces.

No.		Code
1275	Complete with thermometer and both insulators as illustrated	*Corend*

Diathermy Thermometer

No.		Code
1279	Thermometer for Internal Diathermy Electrodes (Fahrenheit scale)	*Thermo*
1288	As No. 1279, Centigrade scale	*Vertex*

Prostatic Electrode with Thermometer

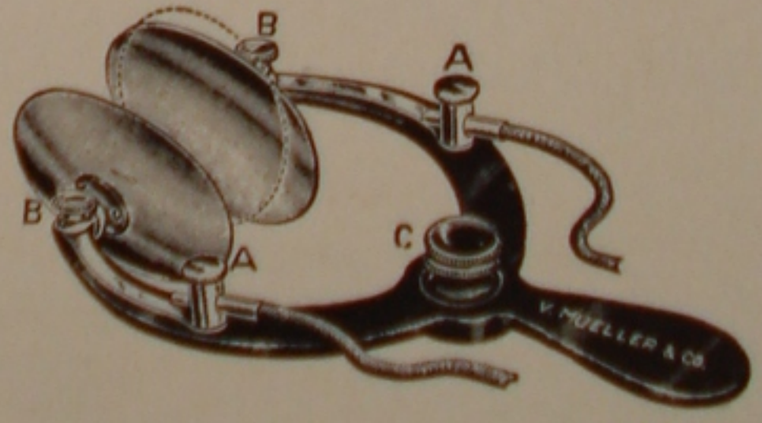


No. 1278

No.		Code
1278	Prostatic Electrode with Thermometer	*Prelth*
1285	Prostatic Electrode. Insulated over all with exception of curved top face	*Marins*
1286	Same as No. 1285, but with thermometer	*Preins*

Epididymitis Electrode

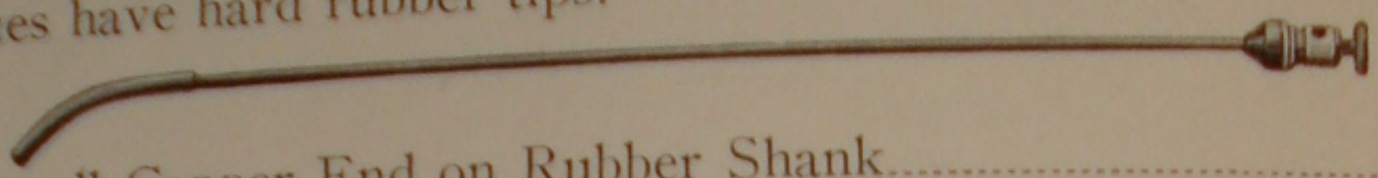
A specially designed clamp arrangement for administering diathermy current.



No.		Code
1277	Epididymitis Electrode	*Corepi*

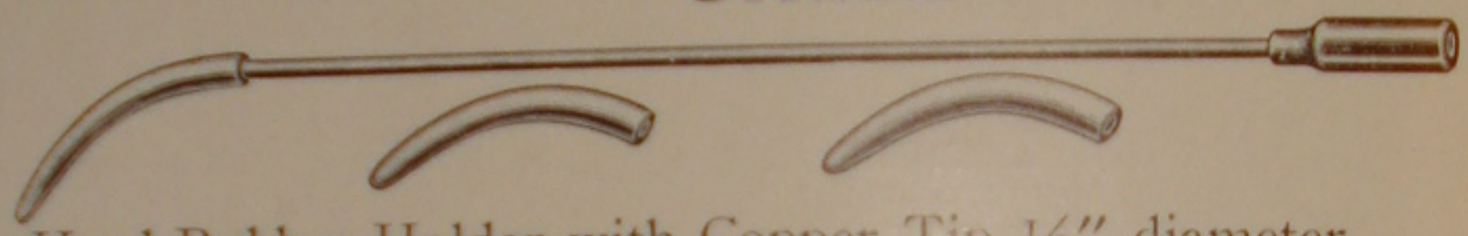
Copper Intra-Uterine Electrodes

Three sizes. The smallest size end is all copper, and the medium and large sizes have hard rubber tips.

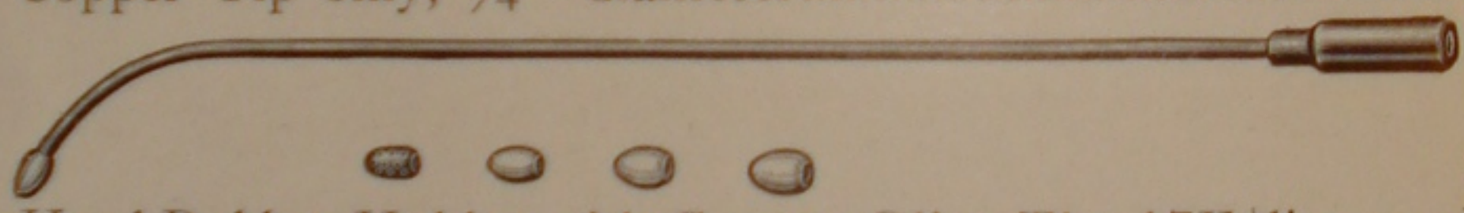


No.		Code
1834	Small Copper End on Rubber Shank	*Nentul*
1835	Medium size Copper End with Hard Rubber Tip	*Nonter*
1836	Large size Copper End with Hard Rubber Tip	*Neural*
1838	Set of 3 Electrodes as above	*Neuter*

Urethral

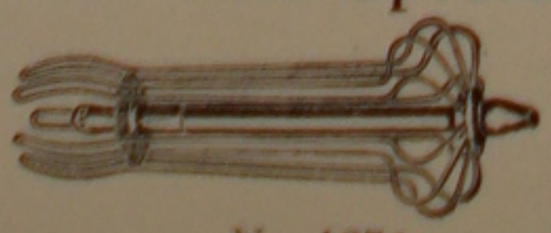


No.		Code
1860	Hard Rubber Holder with Copper Tip ⅛″ diameter	*Nigrit*
1861	Hard Rubber Holder with Copper Tip $\frac{3}{16}$″ diameter	*Varix*
1862	Hard Rubber Holder with Copper Tip ¼″ diameter	*Niobee*
1863	Hard Rubber Holder with set of 3 tips as above	*Nipper*
1864	Hard Rubber Holder, only	*Nisann*
1865	Copper Tip only, ⅛″ diameter	*Noddle*
1866	Copper Tip only $\frac{3}{16}$″ diameter	*Noetic*
1867	Copper Tip only, ¼″ diameter	*Nodose*



No.		Code
1870	Hard Rubber Holder with Copper Olive Tip, 17F dia.	*Nissus*
1871	Hard Rubber Holder with Copper Olive Tip, 20F dia.	*Nitrat*
1872	Hard Rubber Holder with Copper Olive Tip, 23F dia.	*Nitros*
1873	Hard Rubber Holder with Copper Olive Tip, 25F dia.	*Nivose*
1874	Hard Rubber Holder with set of 4 Olives as above	*Nobody*
1875	Hard Rubber Holder, only	*Nocent*
1876	Copper Olive only, 17F diameter	*Noggin*
1877	Copper Olive only, 20F diameter	*Nonact*
1878	Copper Olive only, 23F diameter	*Noncom*
1879	Copper Olive only, 25F diameter	*Nonego*
1880	Perforated Hard Rubber Olive, for Cataphoresis, with Holder	*Noodoo*
1881	Perforated Hard Rubber Olive only	*Norman*

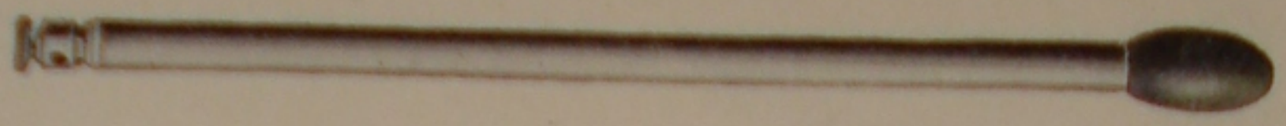
Wire Bath Specula



No. 1276

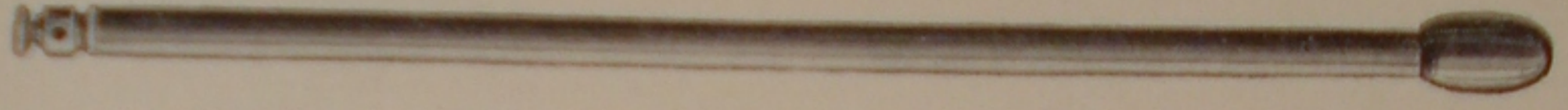
No.		Code
1276	As illustrated	*Cobath*

Carbon Ball



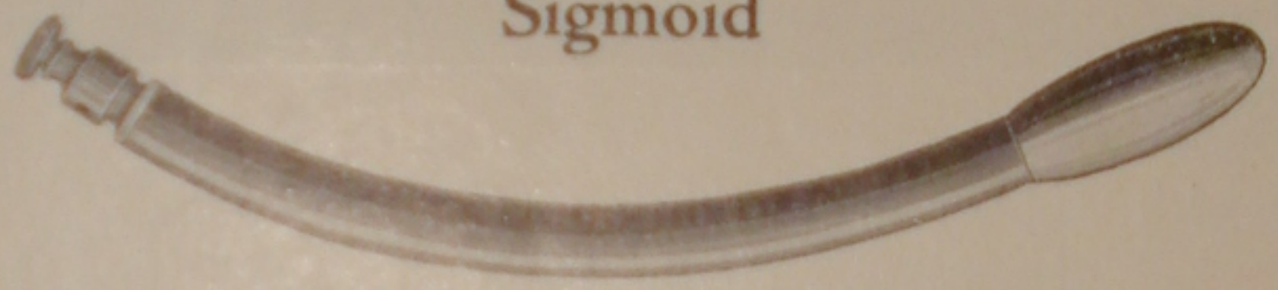
No. 1821 Carbon Ball ..... Code *Marcus*

Oblong Copper Ball



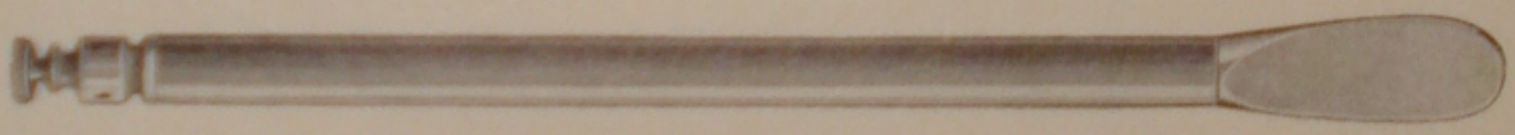
No. 1822 Oblong Copper Ball ..... Code *Margay*

Sigmoid



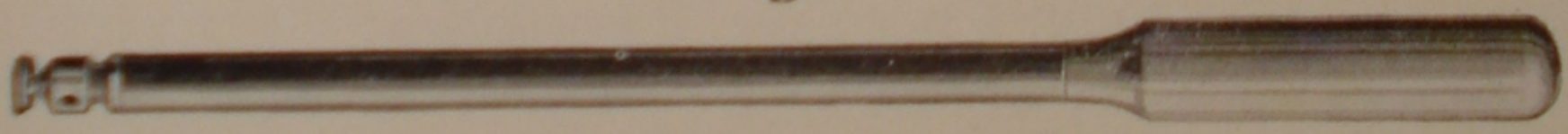
No. 1823 Sigmoid ..... Code *Marine*

Prostatic



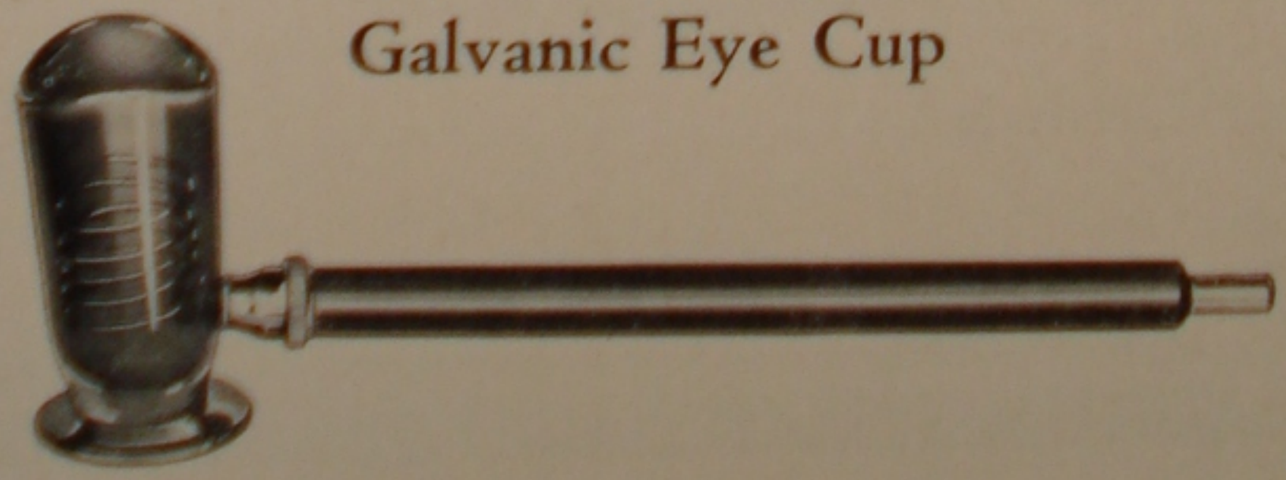
No. 1824 Prostatic ..... Code *Marmo*

Vaginal



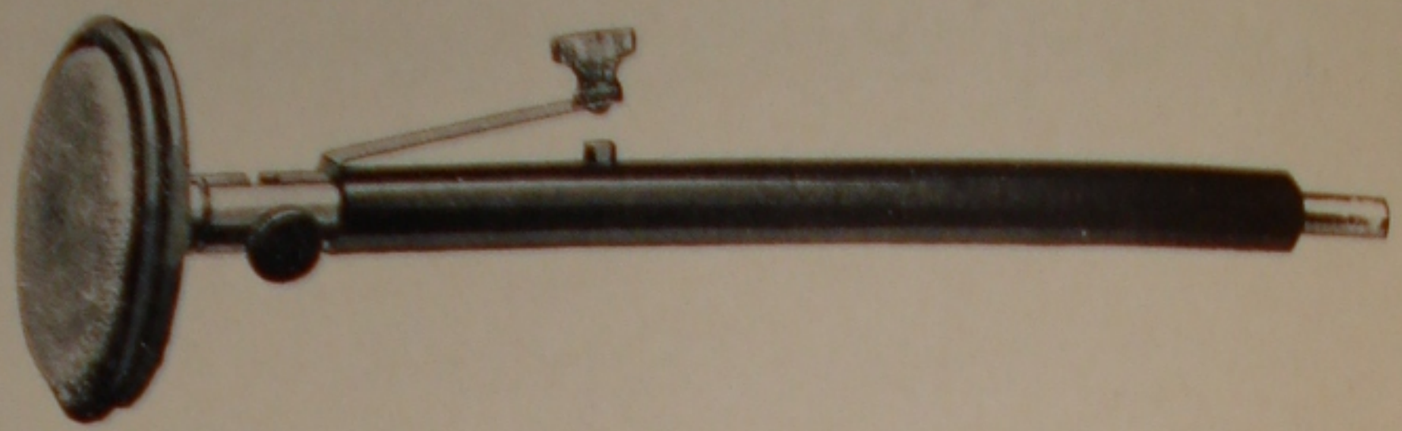
No. 1825 Vaginal ..... Code *Marlin*

Galvanic Eye Cup



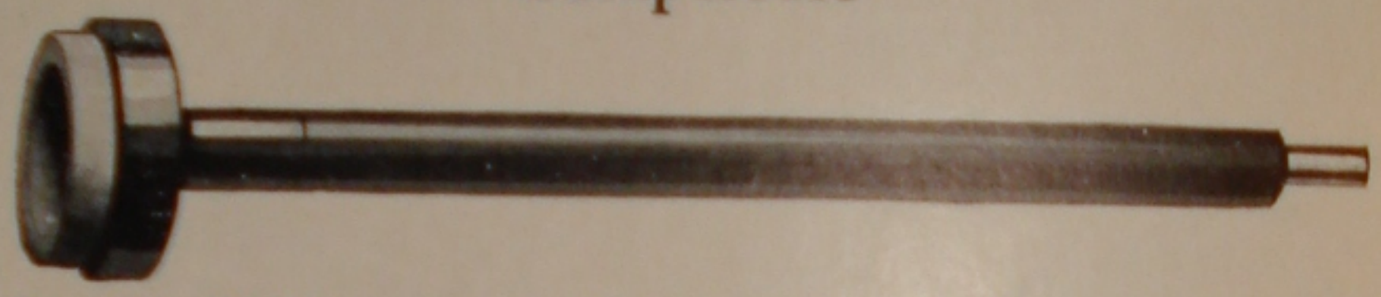
No. 1830 Eye Cup (for Galvanism) ..... Code *Marly*

Interrupter Handle With Moist Pad



No.
1831 Interrupter Handle with Moist Pad ..... Code *Mashe*

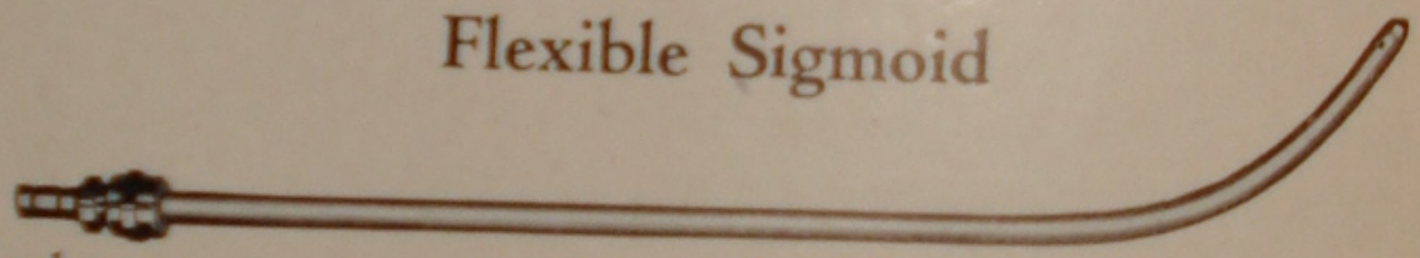
Cataphoric



Electrode with Rubber protection and Carbon base.

No.
1832 Cataphoric ..... Code *Mason*

Flexible Sigmoid



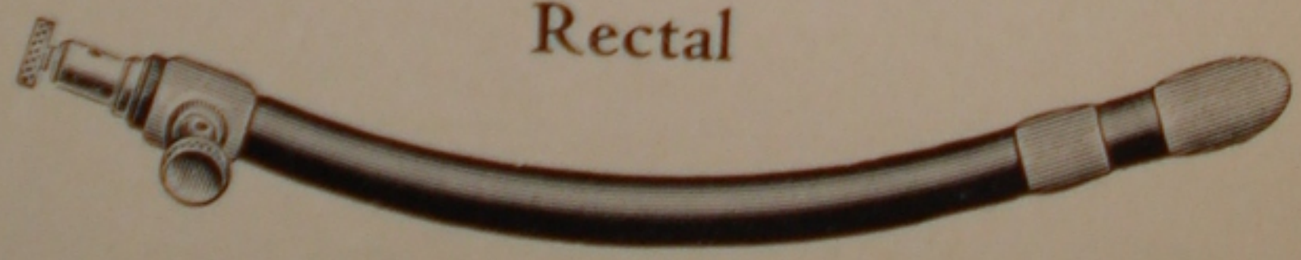
Electrode, constructed of pure block tin tubing, with hose and for flushing attachment.

No.
1833 Flexible Sigmoid ..... Code *Massa*

New Two Pole Electrodes

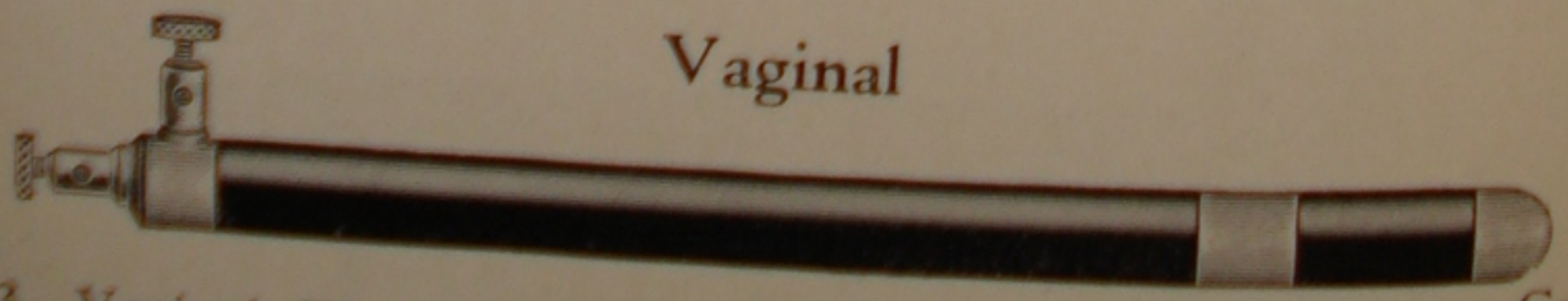
For treating localized conditions in the rectum and vagina.

Rectal



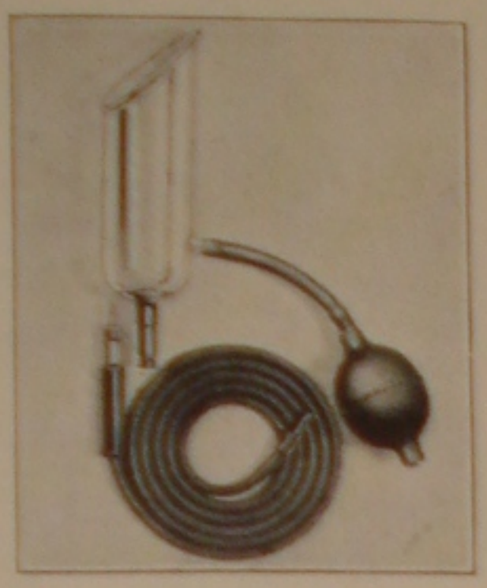
No.
1852 Rectal Electrode ..... Code *Masrec*

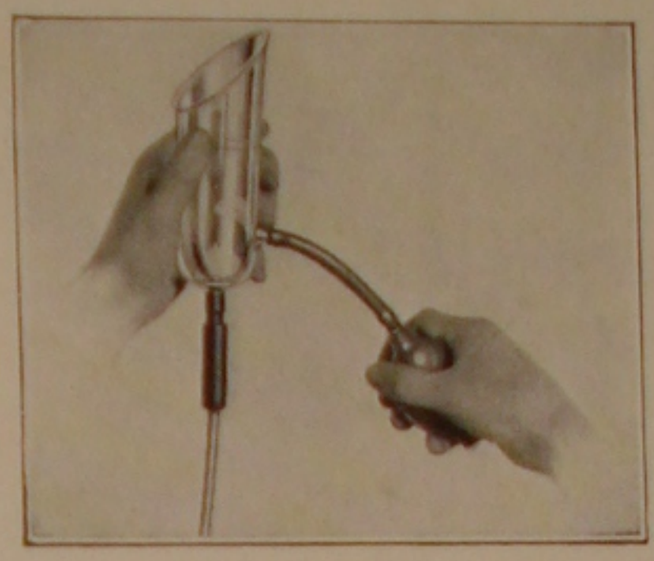
Vaginal



No.
1853 Vaginal Electrode ..... Code *Masvag*

The Fischer-Funck Penile Electrode





Admirably adapted to the Diathermy treatment of gonorrhea (male). The salt water level is altered by depressing or releasing the rubber reservoir bulb. Furnished complete as illustrated.

No.		Code
1890		*Funkel*

"Morse" Surface Electrode

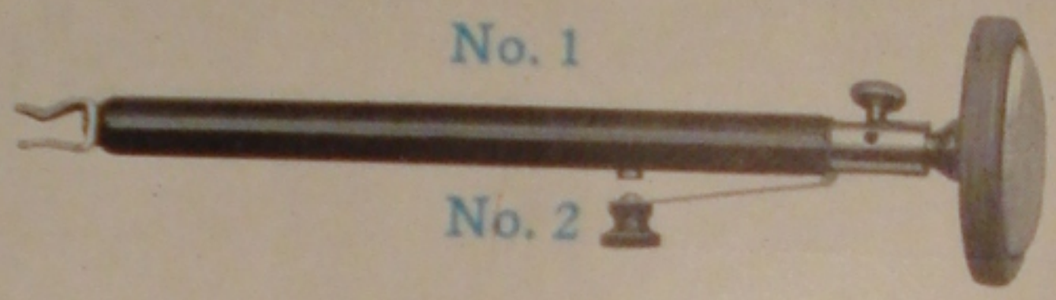


The new model of the "Morse" Moist Surface Electrode is composed of an asbestos compound for conduction, a molded pure rubber back for protection, and a locking device on a cord tip on the electrode, so that accidental detachment is impossible. It is considered to be the best moist conductor ever devised for the purpose. Made in various sizes.

No.		Code
1808	Set Morse Pads and Cords	*Matin*
1810	6x8″ Morse Pad	*Malkin*
1811	5x8″ Morse Pad	*Mallet*
1812	4¼x5¼″ Morse Pad	*Mammer*
1813	4x6″ Morse Pad	*Mankin*
1814	4x5″ Morse Pad	*Mancus*
1815	2¾x8¾″ Morse Pad	*Manful*
1816	2x8″ Morse Pad	*Manger*
1817	Pair 4-ft. Connecting Cords	*Mannia*
1819	Morse Trifurcated Cord	*Margeo*



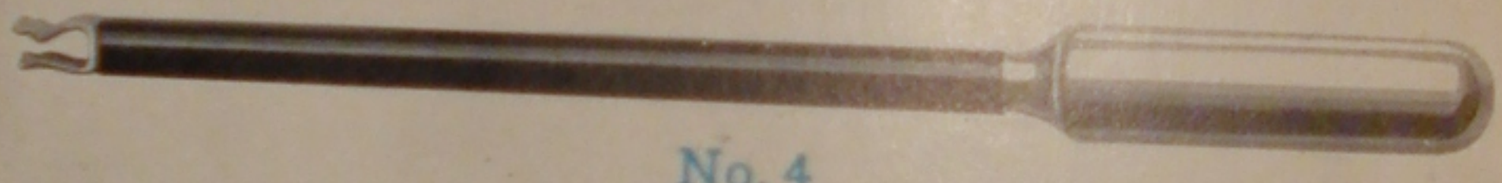
No. 1



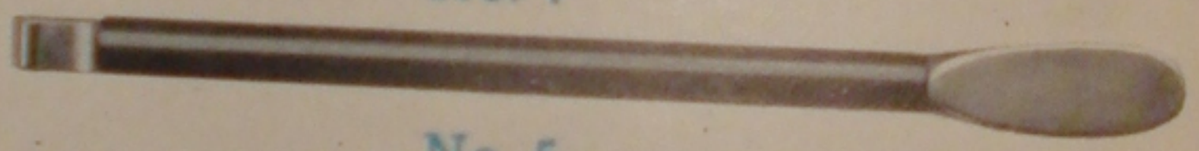
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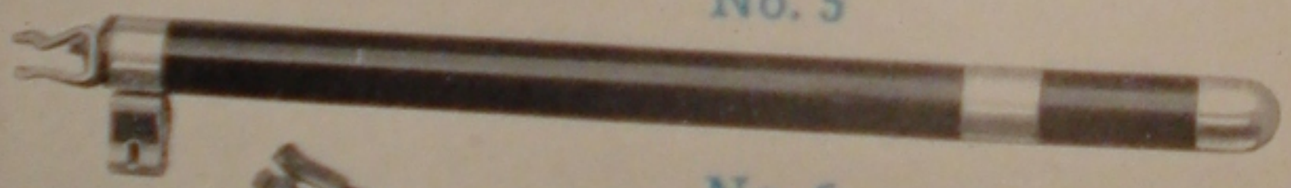
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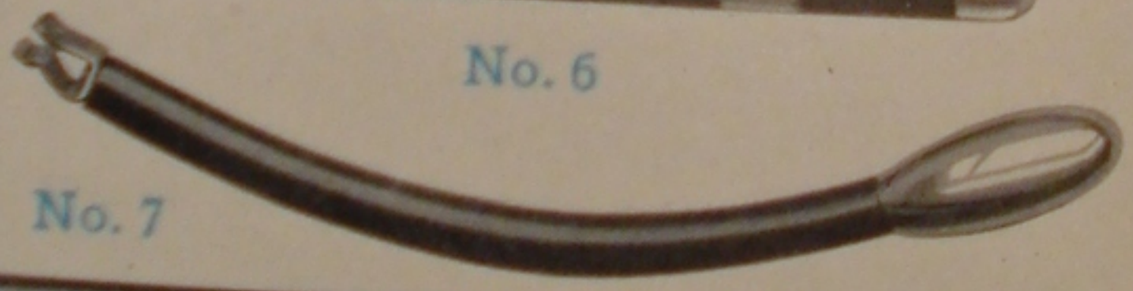
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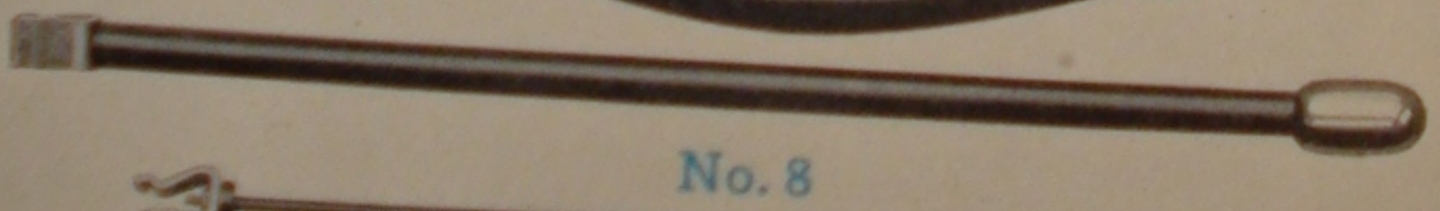
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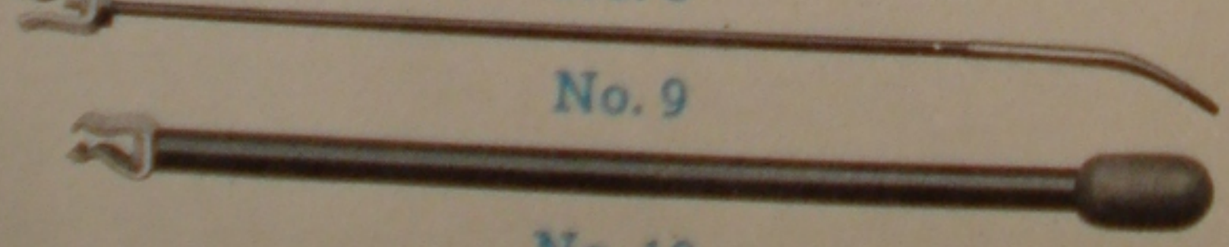
No. 6



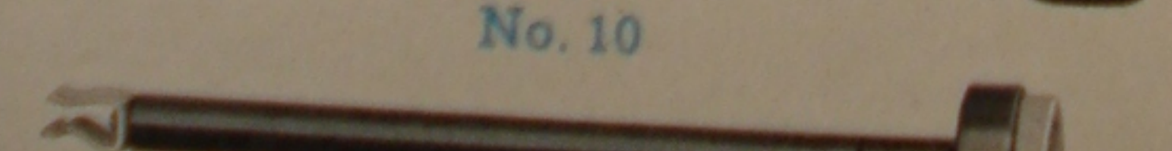
No. 7



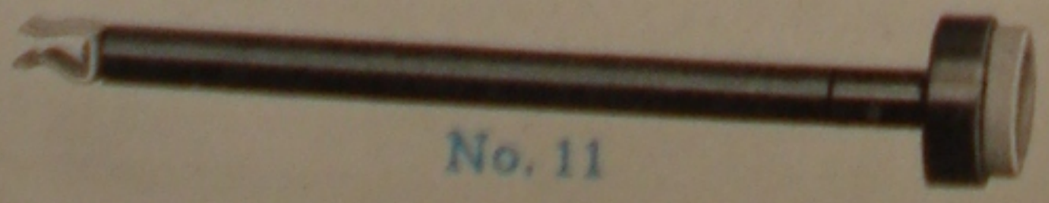
No. 8



No. 9



No. 10

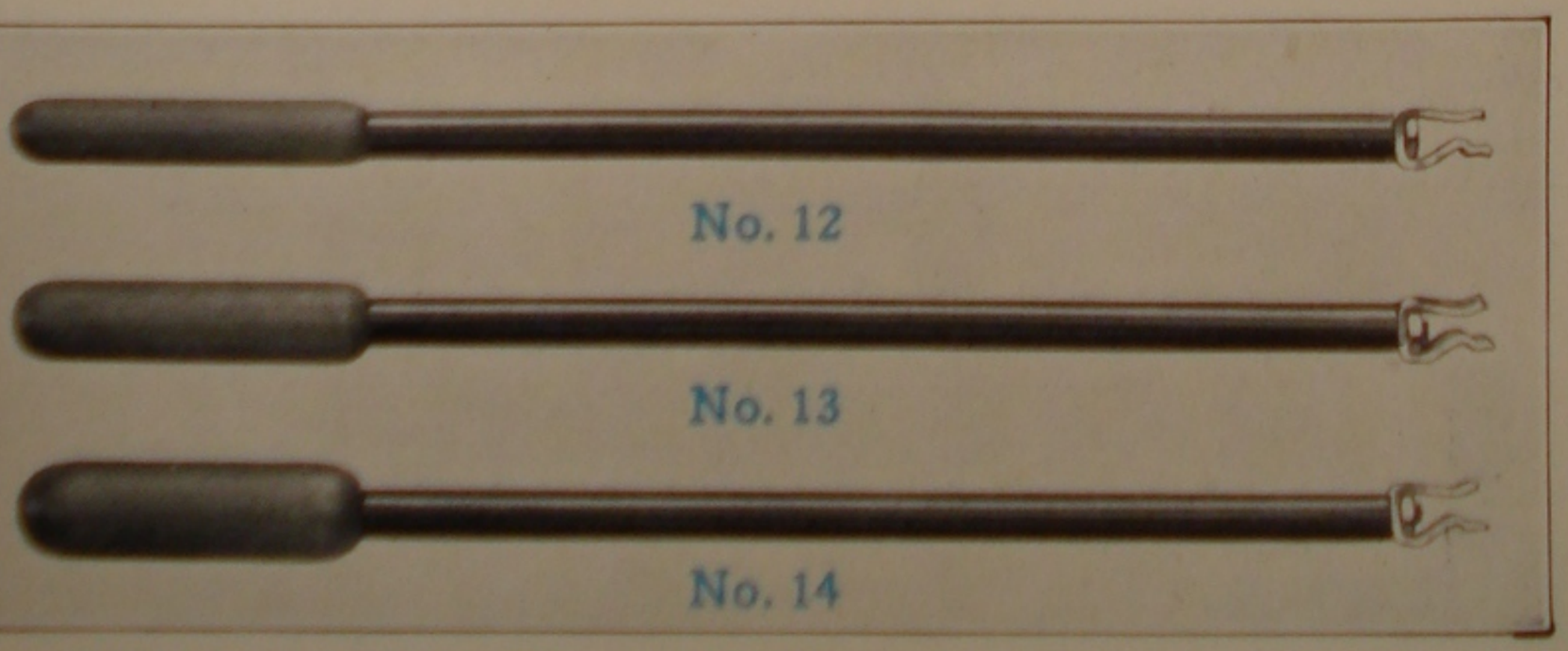


No. 11

Internal Electrodes

These electrodes are essentially the same as those illustrated and described on pages 23 and 24, except that the connectors are of the "Morse" type to accommodate cords furnished with the Morse Wave Generator.

No.		Code
1940	Flexible rectal electrode, for localized muscle exercise to high rectal area as in constipation at region of descending colon, to splenetic flexure. (No. 1)	*Unhat*
1941	Diagnostic electrode, for electro diagnosis (muscle testing) to determine degree of local disability. (No. 2)	*Union*
1942	Bi-polar rectal electrode, for local invigoration of relaxed rectal region. (No. 3)	*Unles*
1943	Vaginal electrode, for general invigoration of pelvic organs (relaxed conditions). (No. 4)	*Unlok*
1944	Prostatic electrode, to massage rhythmically, by muscle contraction (sine wave current). (No. 5)	*Untie*
1945	Bi-polar vaginal electrode, for local invigoration of vagina (relaxed conditions). (No. 6)	*Upend*
1946	Sigmoid electrode, for constipation due to prolapsed descending colon and sigmoid impaction. (No. 7)	*Uphil*
1947	Oblong copper ball, for local astringent effect on mucous surface as in leucorrhea, bleeding hemorrhoids, etc. (No. 8)	*Upset*
1948	Intra-uterine electrode, copper tip, for treatment of endometritis and control of uterine hemorrhoid (positive pole), stenosis of cervix (negative pole). (No. 9)	*Urase*
1949	Oblong carbon ball electrode, for relief of inflammation and relaxed conditions of the uterus and vagina (positive pole). (No. 10)	*Uredo*
1950	Cataphoric electrode, to introduce medicates, using galvanic current. (No. 11)	*Uriah*



No. 12

No. 13

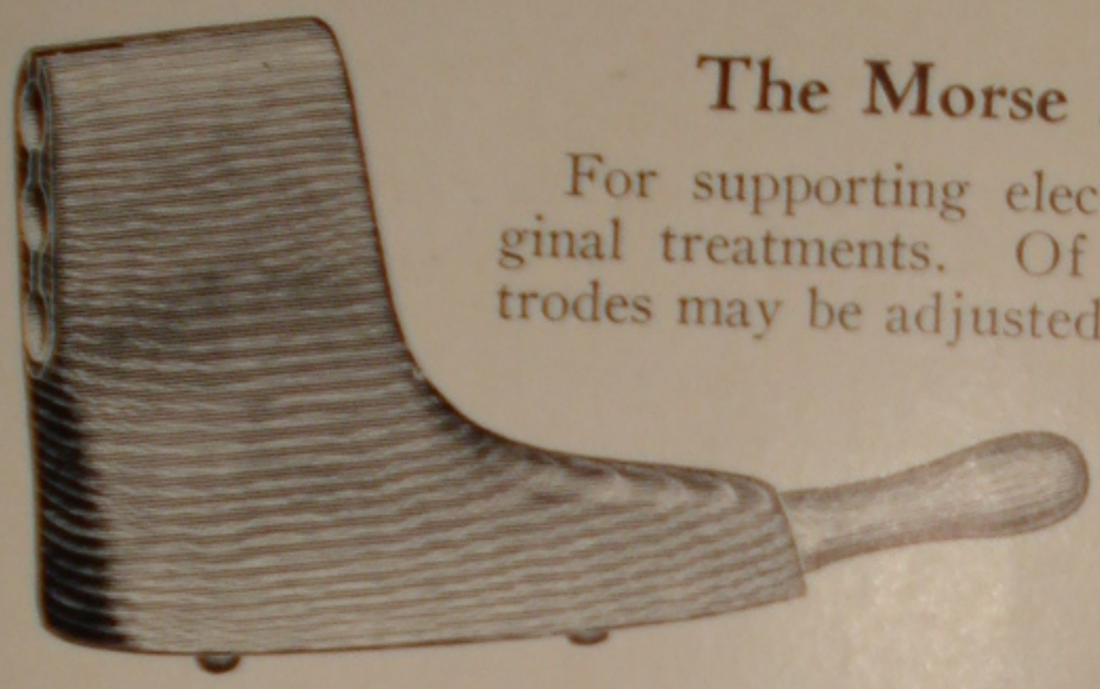
No. 14

Carbon Hemorrhoid Electrodes

For astringent effect, positive pole.

This set of electrodes is furnished in three sizes, where the smaller electrode may be more easily inserted during early treatment, using subsequently the two large ones. Illustrated on page 27.

No.		Code
1951	Carbon electrode—small. (No. 12)	*Uriel*
1952	Carbon electrode—medium. (No. 13)	*Urpod*
1953	Carbon electrode—large. (No. 14)	*Ursan*



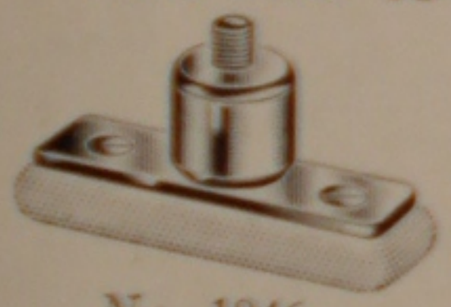
The Morse Electrode Support

For supporting electrodes during rectal and vaginal treatments. Of polished hard wood. Electrodes may be adjusted to three different heights.

No.		Code
1854	Morse "Shoe" Electrode Support	*Moshoe*

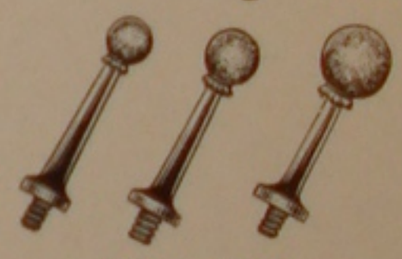
Small Muscle Testing Pads

Pads Nos. 1846, 1847 and 1848 are made with metal backing with asbestos as the absorbent material, and covered with linen.



No. 1846

Nos. 1895, 1896 and 1897 are made of metal with a chamois covering over the ball end.



No. 1898

No.		Code
1846	With pad $\frac{5}{16}$"x1¾"	*Nictat*
1847	With pad ⅜"x1¾"	*Niello*
1848	With pad ½"x1¾"	*Niever*
1850	Set of 3 as above	*Niggle*
1895	Localizing Electrode (Small)	*Valet*
1896	Localizing Electrode (Medium)	*Valid*
1897	Localizing Electrode (Large)	*Valor*
1898	Set of 3 Ball Electrodes	*Varic*

Fischer-Morse Cord-Electrode Adapter



Necessary when employing the cords furnished with the Morse Wave Generator in connection with any of the Fischer Internal Electrodes.

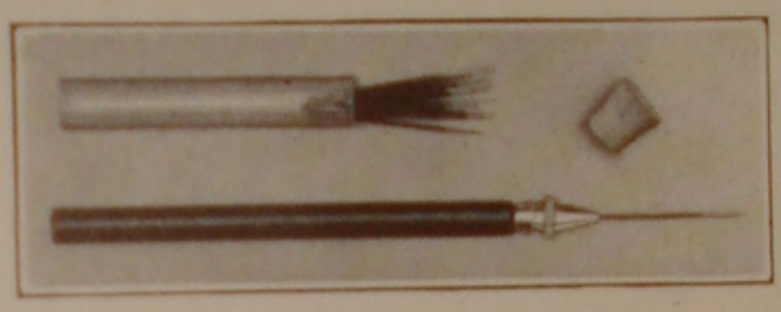
No.		Code
1858		*Morada*

Galvanic Needle Holder

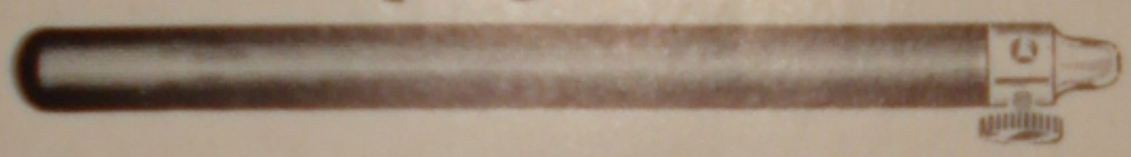


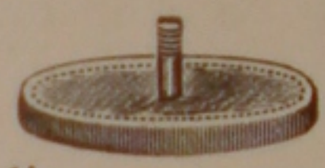
Made of hard rubber with nickel-plated metal clamp.

No.		Code
1900	Galvanic Needle Holder	*Myope*
1901	Galvanic Needles (12 in glass tube)	*Myrrh*
1904	Rubber covered Galvanic Cords, 2 colors—red and gray	*Mycor*



Spongio Discs and Handles

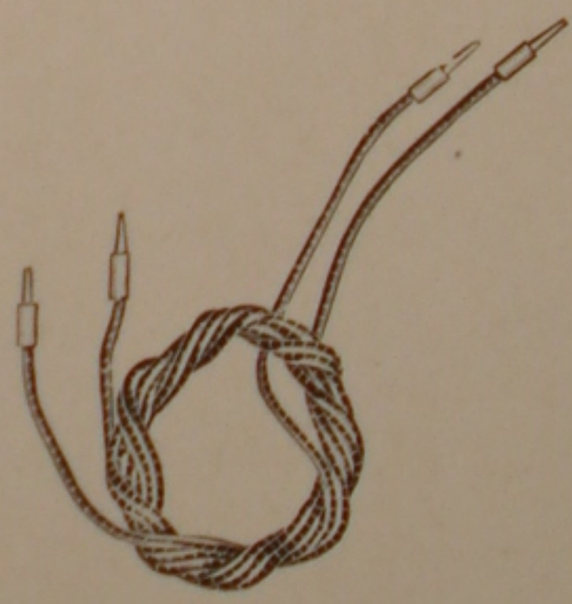




Universal Handle, hard rubber, with Felt covered disc.

No.		Code
314	Felt Covered Disc	*Carsid*
315	Hard Rubber Handle	*Carhan*
316	Felt Pad Disc and Handle	*Carmin*

Treatment Cords

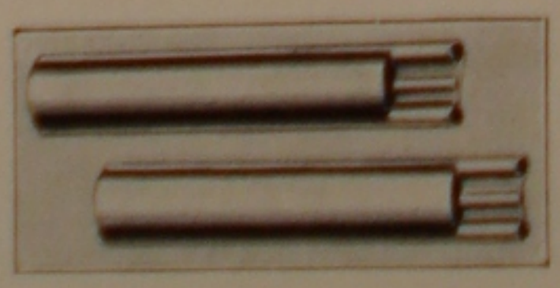


Made of very flexible Copper stranded wire, covered with a mercerized sheathing, maroon colored. Have metal tips on both ends.

No.		Code
312	Cords	*Carol*

Metal Treatment Handles

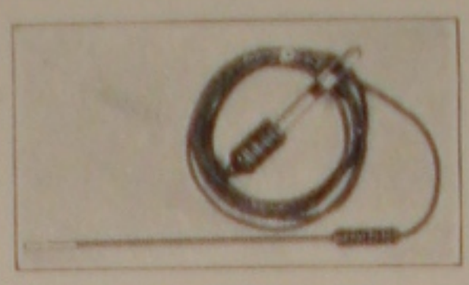
Nickel-plated handles, for Sinusoidal, Galvanic and Faradic treatment.



No.		Code
311	Handles, pair	*Caries*

The Fischer "Diathermo Indicator"

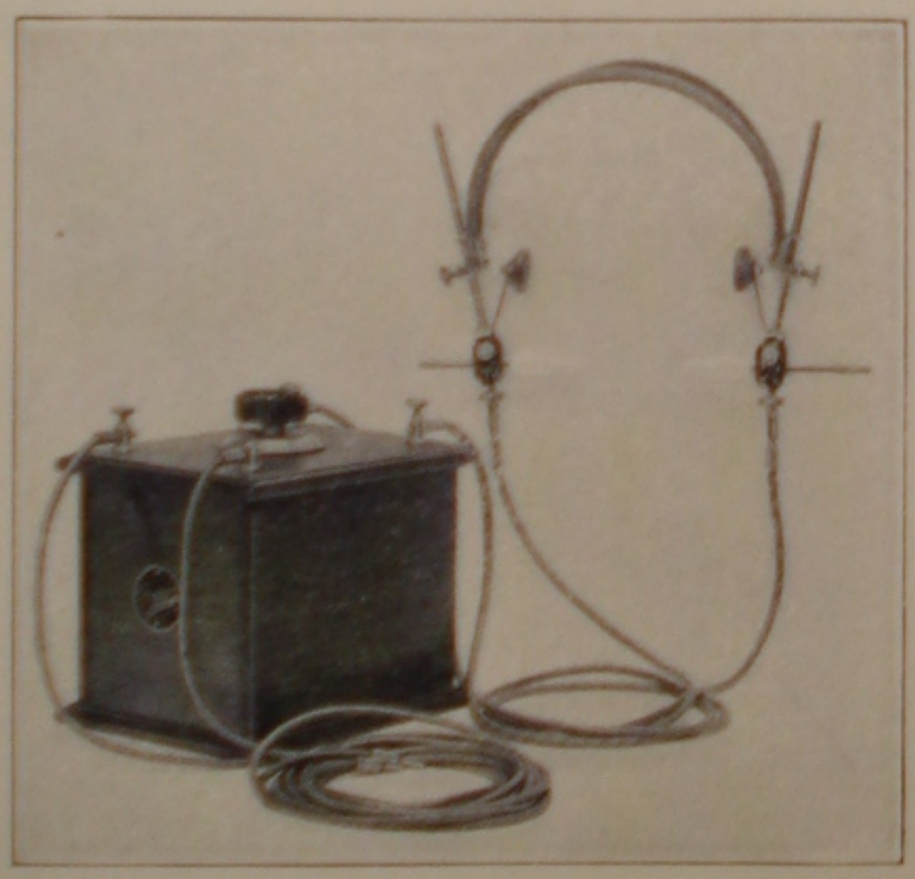




Physicians are fast learning that they can reproduce results provided they can duplicate the amount of given heat for a certain length of time, and with this new instrument an assured fact we look forward to tremendous strides in Diathermy accomplishments in the near future. The little instrument, which we are calling the Fischer "Diathermo Indicator," and its use will prove an innovation in the art of applying Diathermy, and the problem is now passed directly back to the physician—it will be up to him to register his readings, and to prove beyond a shadow of doubt that duplication of results is easily possible.

No.		Code
1751	The "Diathermo Indicator"	*Fidind*

The Linn Ear Electrode and Control



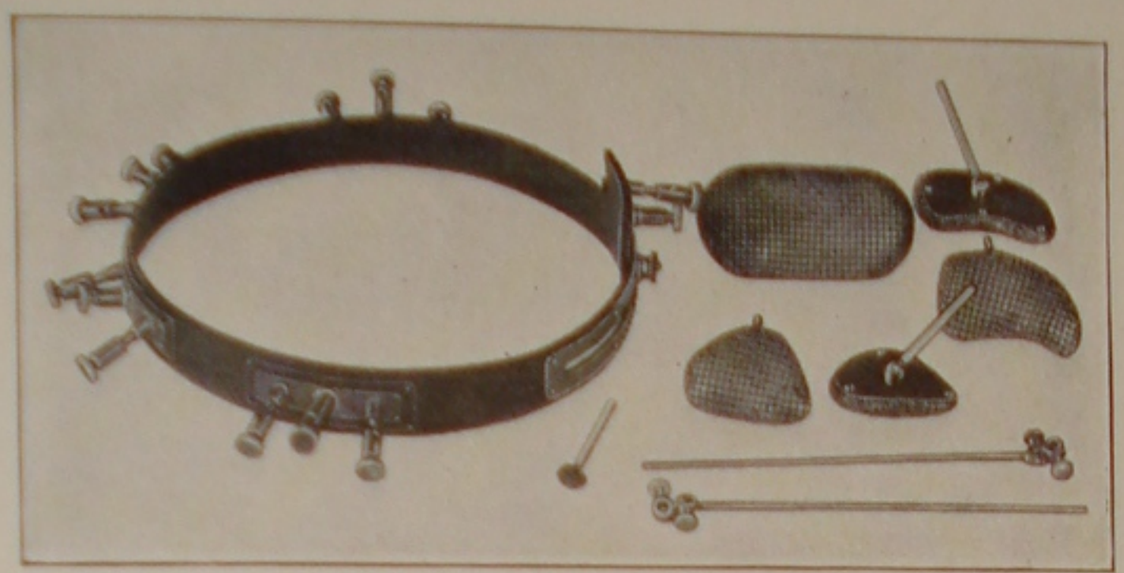


The Linn Ear Electrode and Current Control is an innovation for diathermy treatment. The patient controls the heat at all times independent of the current produced by the high frequency machine.

Comfortable, perfectly insulated and easily adjustable.

No.		Code
1270	Linn Ear Electrode	*Lineal*
1272	Linn Ear Electrode Control	*Lincon*

The Hollender-Cottle Headband and Electrodes





This perfected headband is a wonderful help to the physician in giving diathermy treatments to the head and face. Outfit consists of headband with connections for electrodes, electrode holders and special electrodes. Headband and electrodes are readily adjusted to give proper pressure in any combination of applications.

No.		Code
1360	Hollender-Cottle Headband with electrodes as illustrated and listed below	*Veader*
1361	Head Band with Binding Posts only	*Vector*
1362	Long Electrode Support	*Vedett*
1363	Short Ear Rod with Sponge Tip	*Vegtal*
1364	Oval Electrode	*Veined*
1365	Curved Electrode	*Velate*
1366	Triangular Electrode	*Vellum*



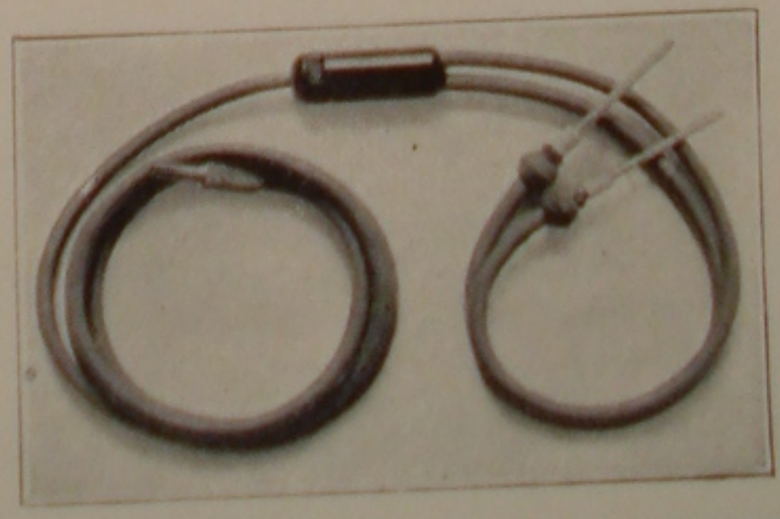




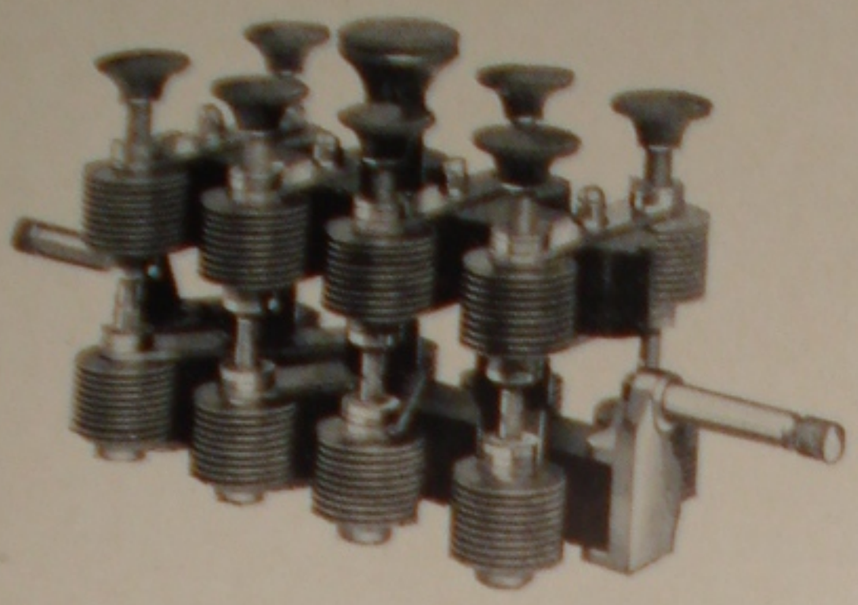


Biaural Cords

1765 As illustrated .....*Wagcur*



The Kolischer Spark Gap



A vast improvement over any other type of Spark Gap ever devised for any high frequency machine.

This "Kolischer" Gap will fit the supports on any Fischer or Thompson-Plaster Styles "F" and "F-O" machines, as well as the Types "L," "L-O" and "Military" models without alterations or other attachments.

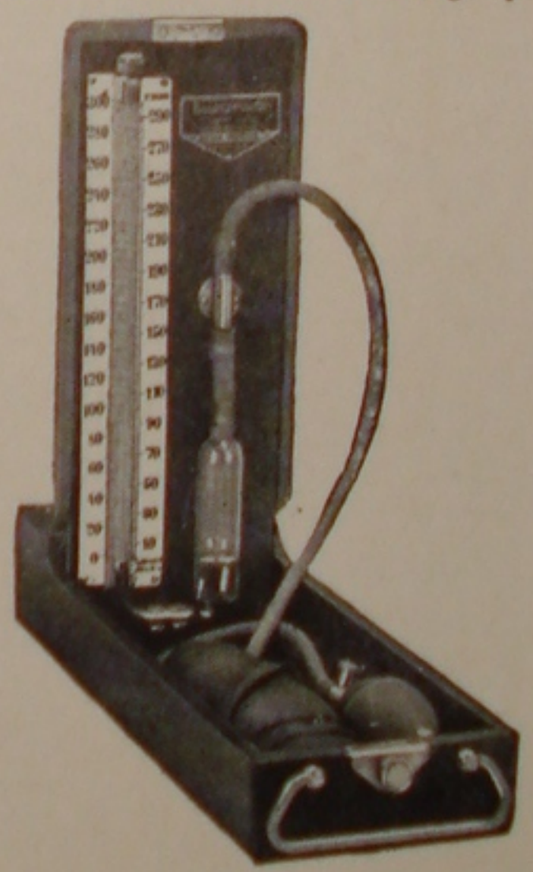
This new Multiple Spark Gap is equipped with 16 Tungsten spark interrupter points, adequate copper flanging to carry away all heat, and individual control for each set of tips as well as master controller for simultaneous adjustment. Quiet, perfect control is possible at any voltage or milliampereage, more constant discharge obtained at any setting, and the regulation is gradual—as compared to the usual jumps—the utmost in utility and flexibility.

No.		Code
1222	Kolischer Spark Gap	*Kolgap*

The Baumanometer

An instrument of precise accuracy for measuring blood pressures. Especially valuable in connection with d'Arsonval Auto-condensation treatments.

No.		Code
436	Desk Model	*Baumon*
437	Kit-Bag Model	*Bankit*
438	Pocket Model	*Bapock*
439	Wallboard Model	*Bawall*



No. 436

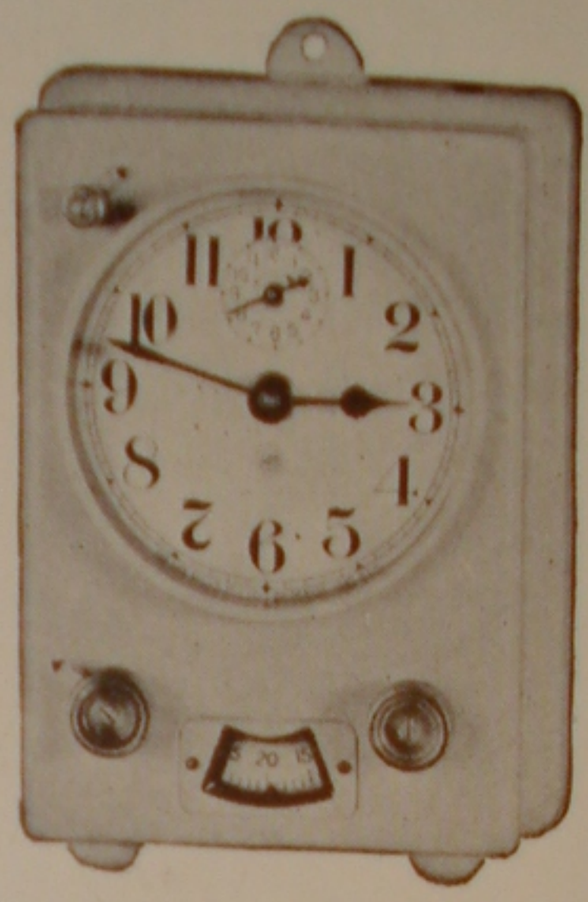


Electrolytic Salt

Specially prepared for electrolytic purposes; one package of ½ pound makes proper and full charge for our No. 615 Leyden Jar, illustrated on page 33.

No.		Code
879	½ lb. package	*Leysal*

The Hawkeye Timer



Registers the length of any treatment exactly. A wonderful aid to accurate timing, particularly valuable when the physician is treating more than one patient at a time. The Hawkeye rings an alarm at the exact moment treatment should end. Should be in every diathermy and quartz light treatment room.

No.		Code
469	Hawkeye Timer	*Vestry*

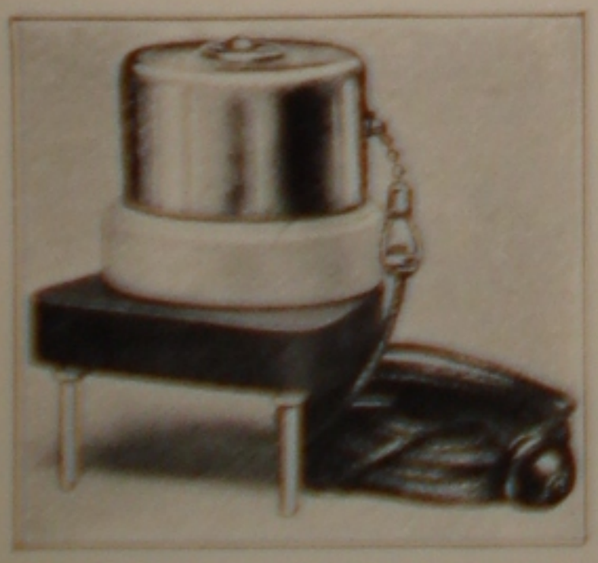


Leyden Jars

Designed for use with our Types "FO," "LO" and Military High Frequency generators. Made of best quality glass, carefully coated.

No.		Code
615	Leyden Jar, complete as illustrated (1 qt. size)	*Hydat*
616	Leyden Jar, less Top and Carbon (1 qt. size)	*Laurel*

Breuer Safety Switch



The terminals of this switch are made to fit the foot switch openings on all Fischer Diathermy Outfits. The switch operates with a pull cord, just like an electric light socket, so that either the physician or the patient may turn the current on or off in a moment. This switch gives patients a feeling of perfect safety.

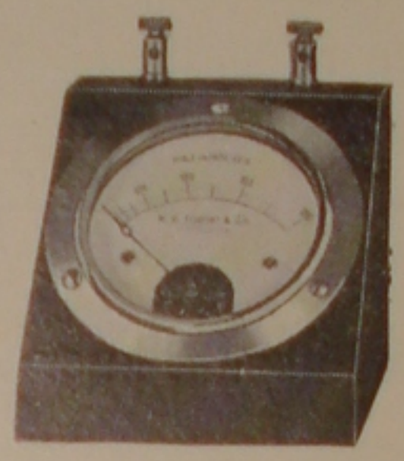
No.		Code
86	Breuer Safety Switch, complete with insulated pull cord	*Varier*

Fischer High Frequency Milliampere Meters—D'Arsonval Type

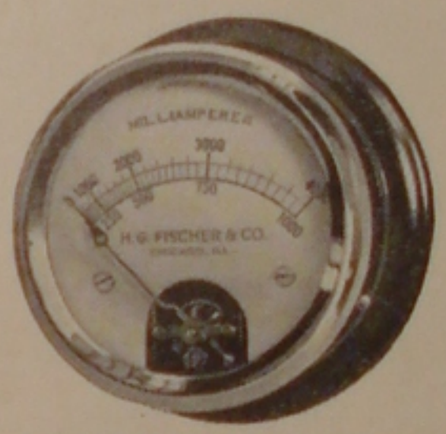
For measuring D'Arsonval and Diathermy currents we have designed special meters of the true "D'Arsonval" type, registering to 5000 milliamperes.



No. 450



No. 452



No. 454

No.		Code
449	Calibrated from 0 to 1500 Milliamperes	*Exo*
450	Calibrated from 0 to 2500 Milliamperes	*Exoda*
451	Calibrated from 0 to 5000 Milliamperes	*Exner*
452	Calibrated 0 to 1000 (Mounted)	*Exmoor*

Catalog No. 452 is specially designed to set on a table, for use with portable machines or small cabinets not previously equipped with meter. Mounted in upright holder, making dial always visible.

No.		Code
454	Calibrated 0 to 1000—0 to 4000 (Double Scale)	*Extong*
462	Double Scale Meter for Senior "FO" and "LO" Outfits	*Barlet*

Fuse for Meter Protection

No.		Code
457	Fuse as furnished with the Fischer Type "G" Portable Diathermy Units	*Gefuse*

Insulating Oil For Transformers

When, for any reason whatever, the insulating oil in which your transformer is immersed needs replenishing, *never use ordinary lubricating material.* The proper oil must be mineral in substance, and capable of withstanding a very high flash test.

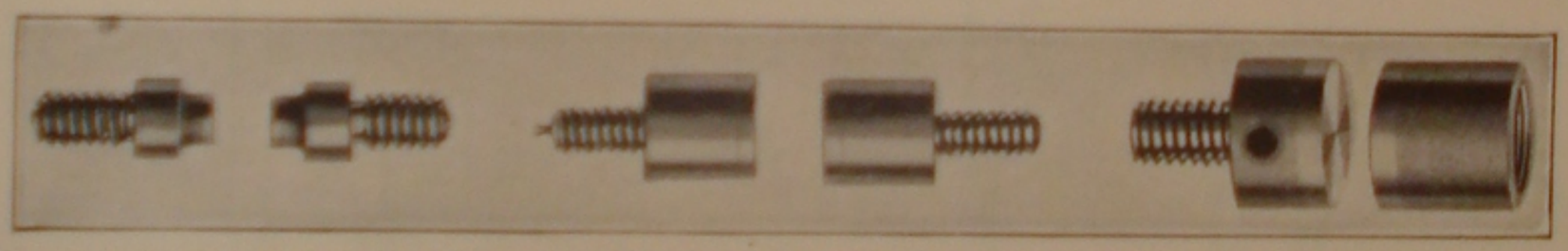
The safest procedure is to order the desired quantity from us, with the assurance that only that oil which is exactly correct will be sent you.

No.		Code
725	Tested Transformer Oil, in 1 qt. can	*Trafil*
726	Tested Transformer Oil, in 1 gal. can	*Tanoil*

Tungsten Spark Interrupter Points

Steel bases faced with a heavy thickness of *pure tungsten* form points for spark interrupters that are almost everlasting, and will improve the action of any High Frequency apparatus not already so equipped.

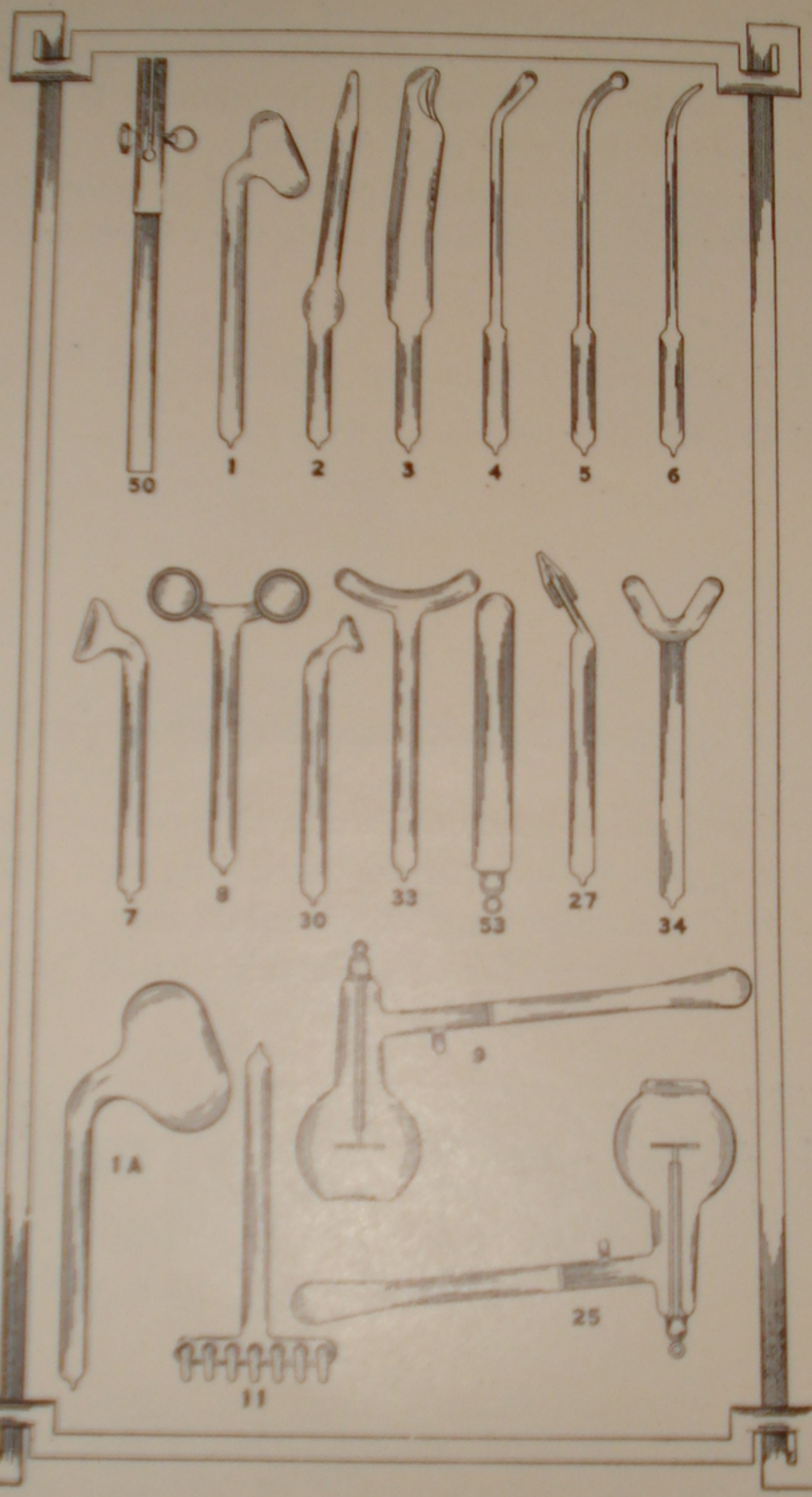
Carried in stock in three sizes, as illustrated, both male and female.



No. 91 No. 89 No. 90

No.		Code
89	¼ inch diameter, as used on our DeKraft and Kolischer Gaps on the "F," "F-O," "L," "L-O" and "Military" machines, each	*Tunpot*
90	⅜ inch diameter, as used on our Portable Types "K" and "G," and the "E" and Eye, Ear, Nose and Throat Cabinets, pair	*Tuntyk*
91	⅛ inch diameter, as used on our Portable Type "F," each	*Tunfpo*

High Frequency Electrodes



High Frequency Electrodes

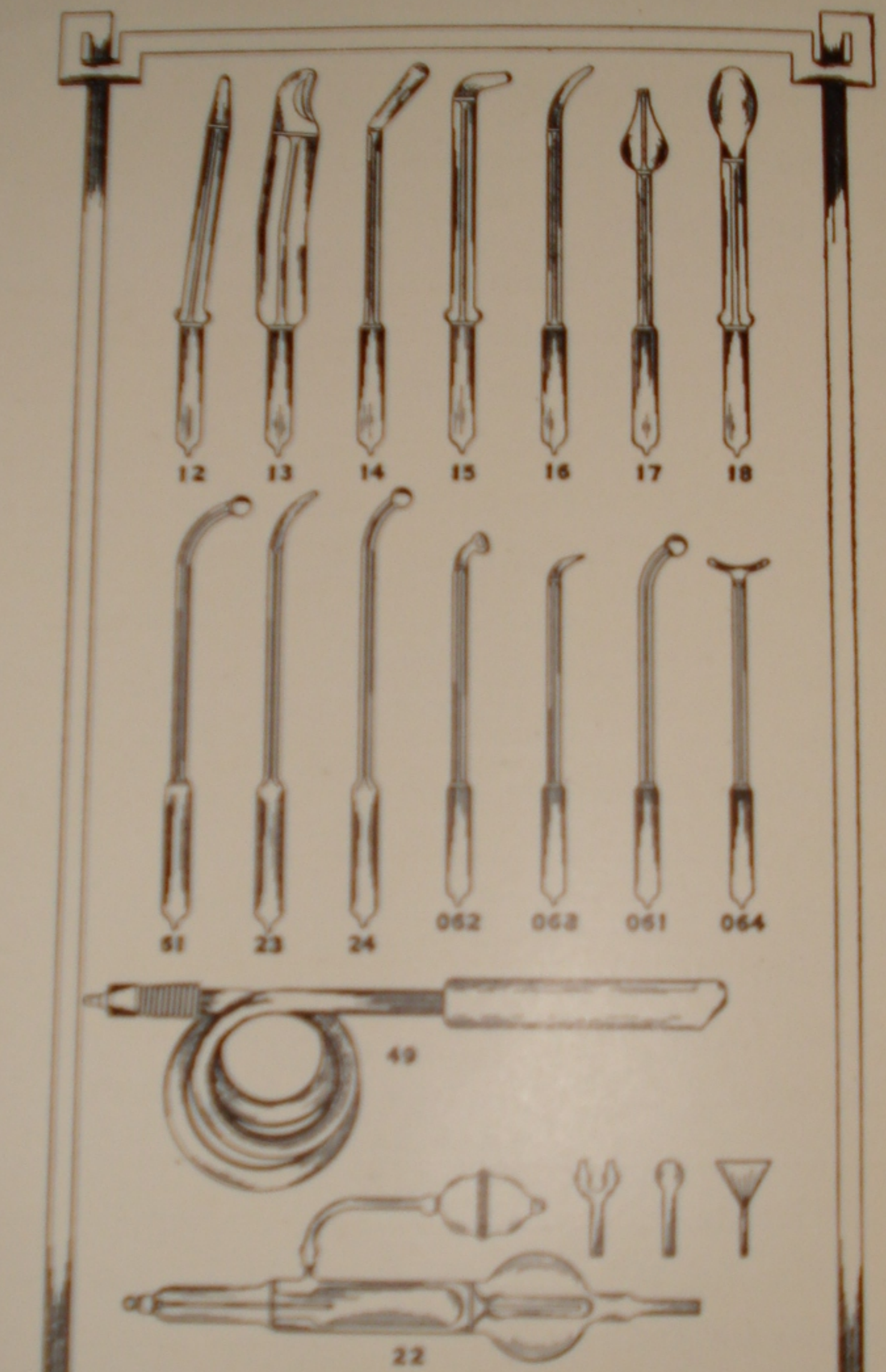
All our glass High Frequency electrodes are made by us, of the very best glass obtainable; carefully annealed. All sizes and makes of holders can be fitted on request, but unless otherwise specified our standard ⅝" size is furnished on all orders.

The "O" before any number signifies ½" stem.

No.	Description	Code
1	—Surface —Plain	*Bacca*
1A	—Surface —Plain	*Gram*
2	—Rectal —Plain	*Bagot*
3	—Vaginal —Plain	*Ballet*
4	—Nasal —Plain	*Balm*
5	—Throat —Plain	*Baric*
6	—Urethral —Plain	*Bark*
7	—Eye, Single —Plain	*Barley*
8	—Eye, Double —Plain	*Basal*
9	—Metal Disc Body Condenser Type	*Basic*
11	—Comb (Scalp)	*Batia*
25	—Cataphoresis	*Binder*
27	—Glass Fulguration	*Guad*
30	—Corn—Small Cavity	*Biogen*
33	—Outer Throat	*Biotic*
34	—Spinal	*Bite*
050	—Universal Handle, ½"	*Boldo*
50	—Universal Handle, ⅝"	*Bolus*
53	—Glass Handle for Indirect Treating	*Bismal*
56	—Adjustable Handle	*Boman*

For Prices see List Attached

Insulated Glass
High Frequency Electrodes



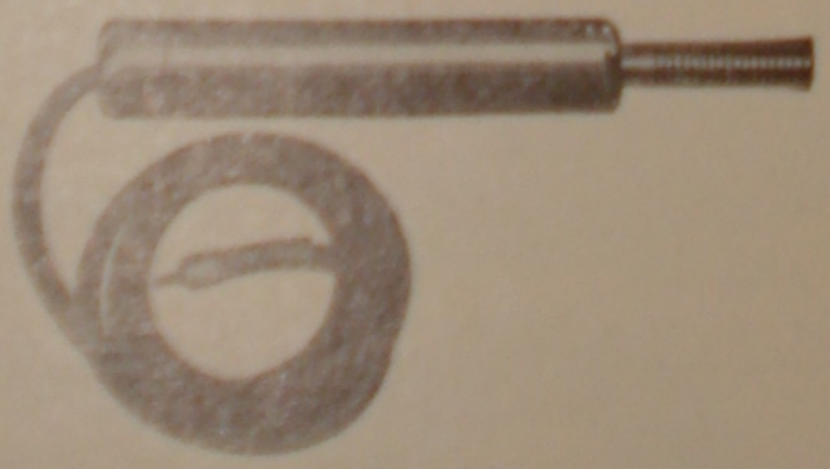
Insulated Glass High Frequency Electrodes

No. Description	Code
12—Rectal —Insulated	*Bazin*
13—Vaginal —Insulated	*Beat*
14—Nasal —Insulated	*Bed*
15—Post Nasal —Insulated	*Beef*
16—Urethral —Insulated	*Bela*
17—Inner Ear —Insulated	*Belt*
18—Tongue —Insulated	*Benzol*
21—Ozone Generator, only	*Bidet*
22—Ozone Generator, complete	*Bidwy*
23—Special Heavy Glass Urethral	*Gull*
24—Special Heavy Glass Throat	*Gum*
36—Insulated Prostatic Electrode	*Inpros*
37—Adenoid Electrode—Insulated (Murray)	*Maner*
049—Insulated Rubber Handle and Cord (For ½" Tubes)	*Blind*
49—Insulated Rubber Handle and Cord (For ⅝" Tubes)	*Block*
61—Throat (Heavy Glass)	*Breath*
061—Dental Pyorrhea, ½" (Heavy Glass)	*Brein*
062—Dental Cocain, ½" (Heavy Glass)	*Bridge*
063—Dental Cavity, ½" (Heavy Glass)	*Bridle*
064—Dental Outer Gum, ½" (Heavy Glass)	*Brim*

Insulated Shock Proof Handle for High Frequency Electrodes

Made entirely of one piece of hard rubber, with the heavy insulated connecting cord fastened securely to the spring brass clamp inside.

No.	Code
049—For ½" Electrodes	*Blind*
49 For ⅝" Electrodes	*Block*

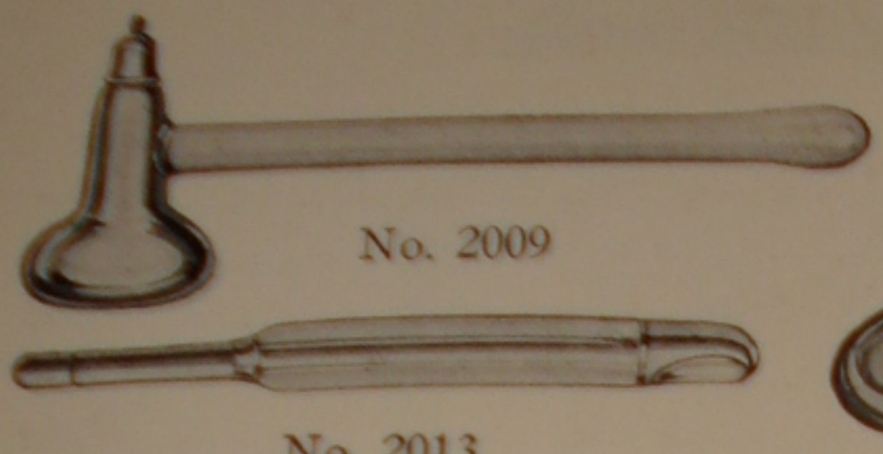


No. 80

80 Extra Long Protected Handle ..... *Blesp*

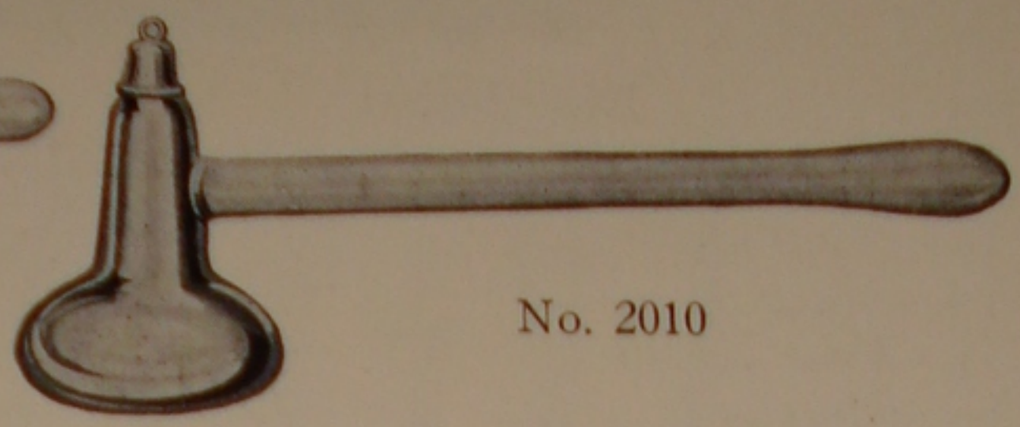
For Prices see List Attached

Non-vacuum High Frequency Electrodes



No. 2009

No. 2013



No. 2010

The Silvered "Non-vacuum" Tubes are made in the same sizes and designs as the regular cataloged Vacuum Electrodes described in the foregoing. Plain or Insulated will be furnished, as ordered.

No.	Description	Code
2001—Surface	—Plain—2-inch face	*Rabat*
2002—Rectal	—Plain	*Rabid*
2003—Vaginal	—Plain	*Racer*
2004—Nasal	—Plain	*Raket*
2005—Throat	—Plain	*Radle*
2006—Urethral	—Plain	*Radio*
2007—Eye	—Single	*Radex*
2008—Eye	—Double	*Raflo*
2009—Surface	—Condenser Type, Med.	*Raged*
2010—Surface	—Condenser Type, Lge.	*Rally*
2011—Comb	—Scalp	*Ramie*
2012—Rectal	—Insulated	*Ranch*
2013—Vaginal	—Insulated	*Randy*
2014—Nasal	—Insulated	*Range*
2015—Post Nasal	—Insulated	*Rapid*
2016—Urethral	—Insulated	*Rasal*
2017—Inner Ear	—Insulated	*Ratan*
2018—Tongue	—Insulated	*Ravel*
2023—Urethral	—Special Heavy Glass	*Razee*
2024—Throat	—Special Heavy Glass	*Razor*
2025—Cataphoresis		*Reach*
2030—Corn	—Small Depression	*Rebec*
2033—Outer Throat		*Rebus*
2034—Spinal		*Recal*
2036—Prostatic	—Insulated	*Recto*
2061—Dental Pyorrhea	—Heavy Glass	*Refit*
2062—Dental Cocain	—Heavy Glass	*Reign*
2063—Dental Cavity	—Heavy Glass	*Reims*
2064—Dental Outer Gum	—Heavy Glass	*Relax*

These Electrodes, with exception of Nos. 2009, 2010, and 2025 will have our regular ⅝" shanks.

Nos. 2009, 2010 and 2025 have Insulated Handles blown on the electrodes themselves.

Non-Vacuum Tubes may be had to fit the ½" Handles by placing "O" before catalog number when ordering except those which have handles attached.

For Prices see List Attached

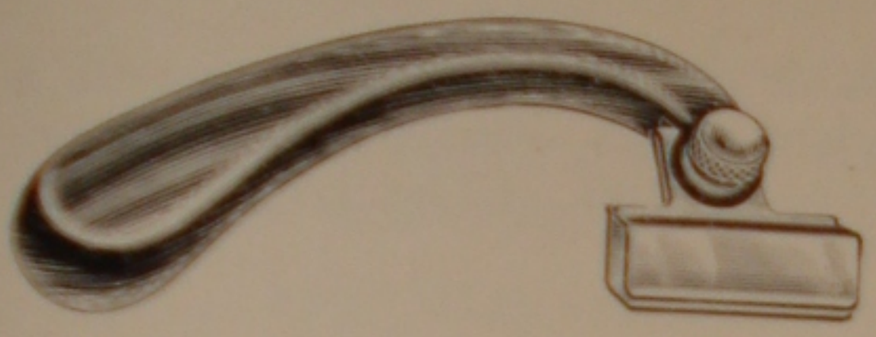
Universal Handle for High Frequency Electrodes



Insulated section made of hard pressed fiber, having nickel-plated brass spring clamp on end for holding Electrodes firmly in position. Large swivel ring connector to which is hooked the insulated cord, permits of perfect freedom of movement. Made in two sizes.

No.		Code
050	For ½" Electrodes	*Boldo*
50	For ⅝" Electrodes	*Bolus*

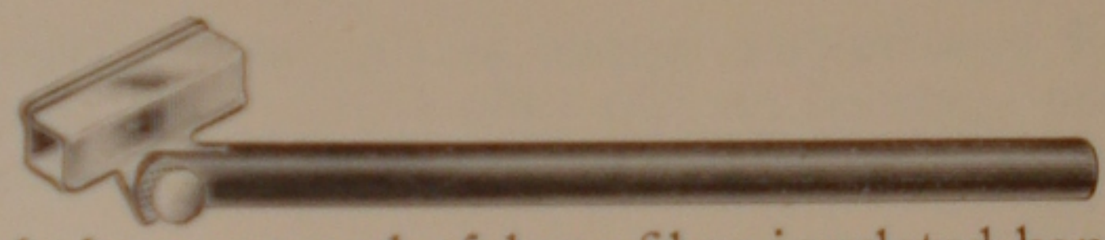
Patients High Frequency Handle



Holds any high frequency electrode with ⅝ inch shank. Hardwood, nickel-plated clip.

No.		Code
57	Patients High Frequency Handle	*Holcot*

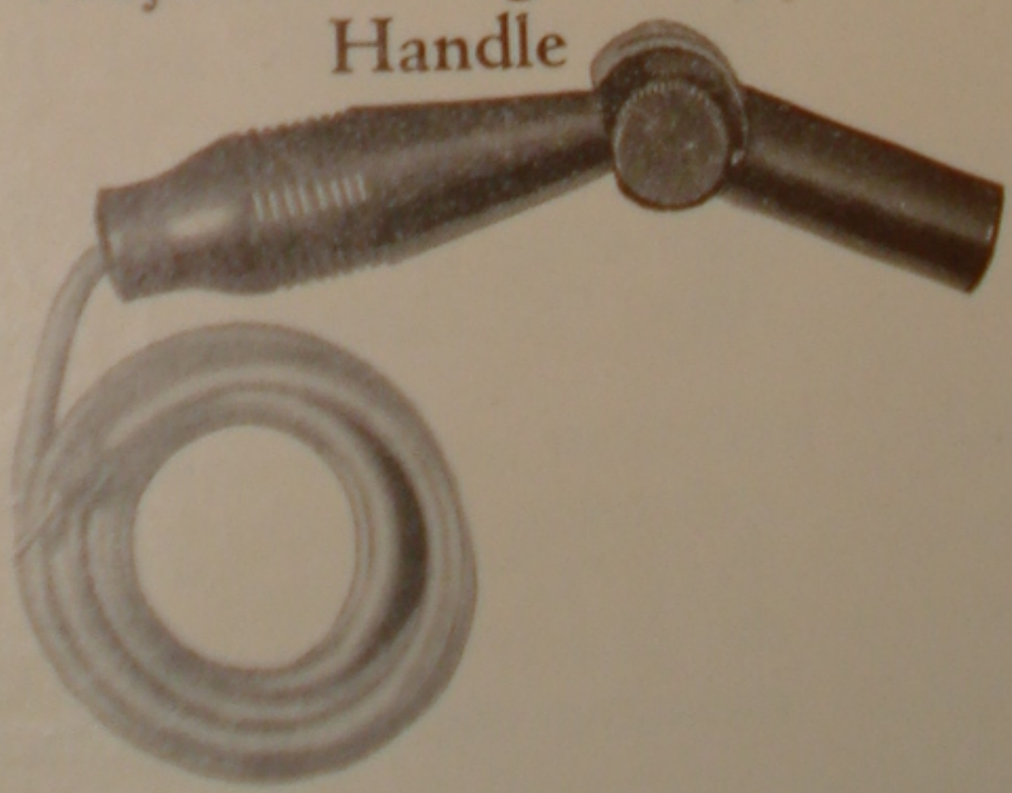
Adjustable High Frequency Handle



Nickel-plated clamp on end of long fibre insulated handle is arranged to swivel freely as desired to any angle. A very convenient arrangement especially for orificial work.

No.	Code
56	*Boman*

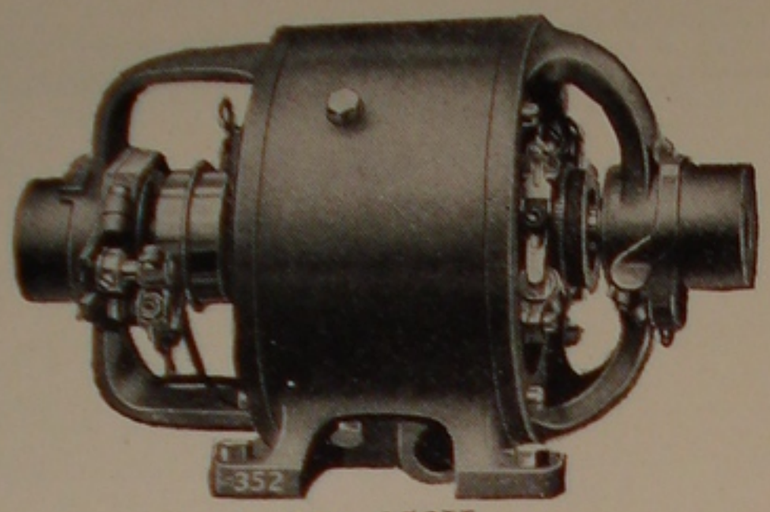
Hollender-Cottle Insulated Adjustable High Frequency Handle



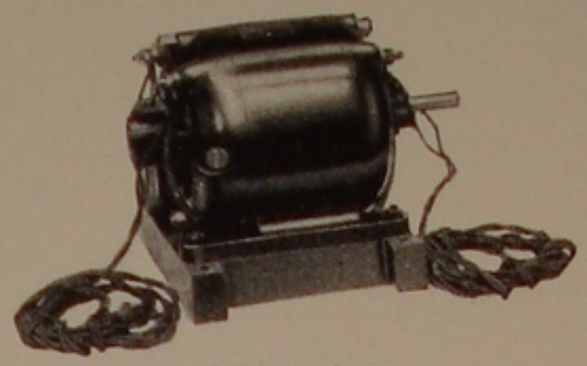
This perfected high frequency handle is made of hard rubber, with cord attached, ready for use with any standard ⅝ inch electrode. No bare metal, no shocks, utmost convenience and comfort in treating patient.

No.		Code
59.	Hollender-Cottle, Insulated adjustable, High Frequency Handle, complete with cord	*Hocoin*

Rotary Convertors



No. 952X



No. 950X

When direct current, only, is available it is necessary to install a rotary converter to operate any efficient High Frequency machine, or any of the late types of small X-ray Outfits. (The larger X-ray machines contain their own rotary converters.)

Our 110 volt rotaries have a special booster winding which insures a full 110 volt A. C. when operated on 110 volts D. C.

Our 220 volt rotaries are tapped at the proper point to give 110 volts A. C. when operated on 220 volts D. C. This eliminates the use of separate step-up or step-down transformers and the loss of efficiency attending their use.

All our Rotary Converters are equipped with a special Condenser, for line protection.

No.		Code
950	300 Watt capacity—operating on 110 Volts D. C., and delivering 110 Volts 60 Cy. A. C. Designed for our types "C" and "K" and "D" outfits	*Emolo*
951	400 Watt capacity—operating on 110 Volts D. C., and delivering 110 Volts 60 Cy. A. C. Designed for our types "E" Cabinet and Portable	*Egret*
952	1000 Watt capacity—operating on 110 Volts D. C., and delivering 110 Volts 60 Cy. A. C. Designed for our Type "L," "Military" and Style "F" Cabinets, also the No. 1, De Luxe or Type "R" X-ray Machines including enclosed type Starting Box "Scurvy"	*Ennui*

954 500 Watt capacity—operating on 110 Volts D. C., and delivering 110 Volts 60 Cy. A. C. Designed for our Types "G" Diathermy Outfits.....*Enporg*

955 300 Watt capacity—operating on 220 Volts D. C., and delivering 110 Volts 60 Cy. A. C. (See No. 950X).....*Epul*

956 400 Watt capacity—operating on 220 Volts D. C., and delivering 110 Volts 60 Cy. A. C. (See No. 951X).....*Effetc*

957 1000 Watt capacity—operating on 220 Volts D. C., and delivering 110 Volts 60 Cy. A. C. (See No. 952X) including enclosed type Starting Box "Seance".....*Enter*

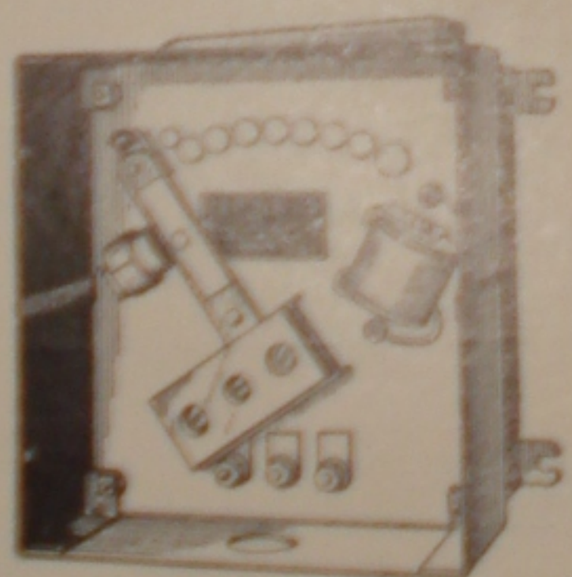
958 5000 Watt capacity—operating on 220 Volts D. C., and delivering 110 Volts 60 Cy. A. C. Designed for use with Type "S" X-ray Apparatus including enclosed type Starting Box "Secede".....*Encabs*

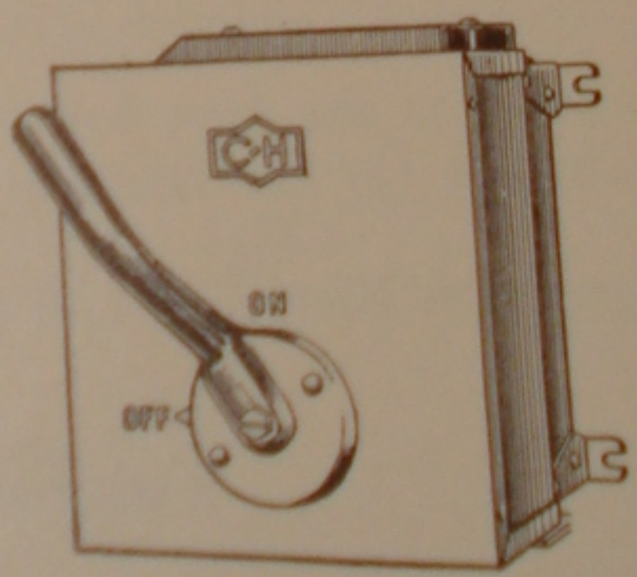
959 500 Watt capacity—operating on 220 Volts D. C., and delivering 110 Volts 60 Cy. A. C. (See No. 954X)....*Enpogs*

977 1500 Watt capacity—operating on 110 Volts D. C., and delivering 110 Volts 60 Cy. A. C. Designed for our larger Diathermy Cabinets including enclosed type Starting Box "Scurvy".....*Mutcho*

978 1500 Watt capacity—operating on 220 volts D. C., and delivering 110 Volts 60 Cy. A. C. (See No. 977X) including enclosed type Starting Box "Seance".....*Myomoa*

Starting Boxes for Rotary Converter





No.		Code
915	Starting Box for 110 V. Rotary 1000 and 1500 W	*Scurvy*
916	Starting Box for 220 V. Rotary 1000 and 1500 W	*Seance*
918	Starting Box for 220 V. Rotary 5000 W	*Secede*

Insulated High Frequency Cord



This cord is made of a stranded copper conductor, covered with several layers of pure gum rubber. At one end is mounted our standard cord tip ($\frac{5}{32}$ inch), which will fit any of our machines, and on the other end is mounted a swivel clasp. Cord is very flexible.

No.		Code
51	Heavy Cord, 4′ long	*Gait*
51-5	Heavy Cord, 5′ long	*Hirtz*
51-6	Heavy Cord, 6′ long	*Hoche*
51-7	Heavy Cord, 7′ long	*Hodge*

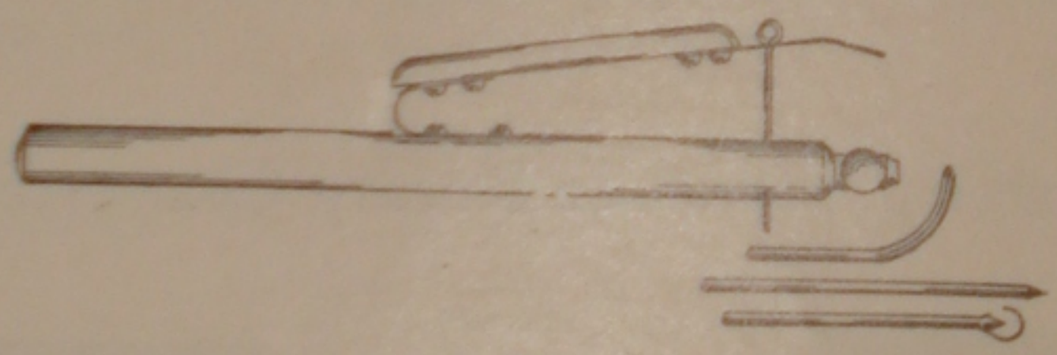
Extra cable, 15c foot

Extra Heavy Insulated Cable

Made similar to our No. 51 but with very heavy rubber insulation.

No.		Code
83	Extra Heavy Protected High Frequency Cord, 5′ long	*Malle*

Fulguration Electrode



Fulguration is the best known method of applying the High Frequency Current for the removal of Warts, Moles and similar growths.

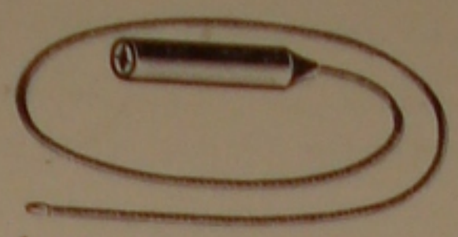
No.		Code
20	Fulguration Electrode and three tips	*Gadol*

Fulguration Wire

Steel music wire, covered with pure gum rubber, for introduction through the cystoscope. When used in connection with one of our High Frequency machines excellent results may be obtained in the removal of growths in the urinary bladder.

No.		Code
40	Fulguration Wire, foot	*Gag*

Fischer Bladder Fulguration Electrode



A special fulguration electrode for use in the bladder through a cystoscope. Made of a hard wire center, insulated with a very small oiled silk covering. Has solid silver tip, olive shaped, of 2mm. diameter and about 4mm. long. Other end is arranged to accommodate an ordinary cord tip.

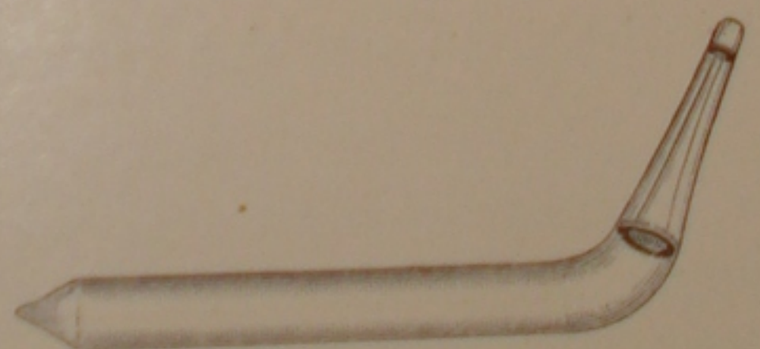
No.		Code
41	Complete as illustrated	*Gagtip*

Special Tonsil Fulguration Electrode



No.		Code
29	Special Throat Fulguration Electrode similar to our No. 23, with wire tip mounted in end	*Gerdy*

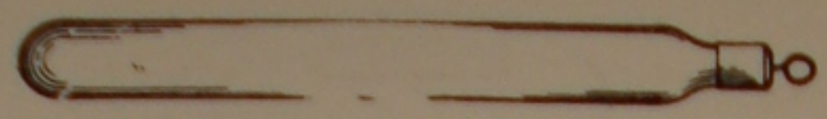
Improved Ear Electrode



Properly shaped, and well insulated.

No.		Code
43		*Gabell*

Glass Vacuum Handles



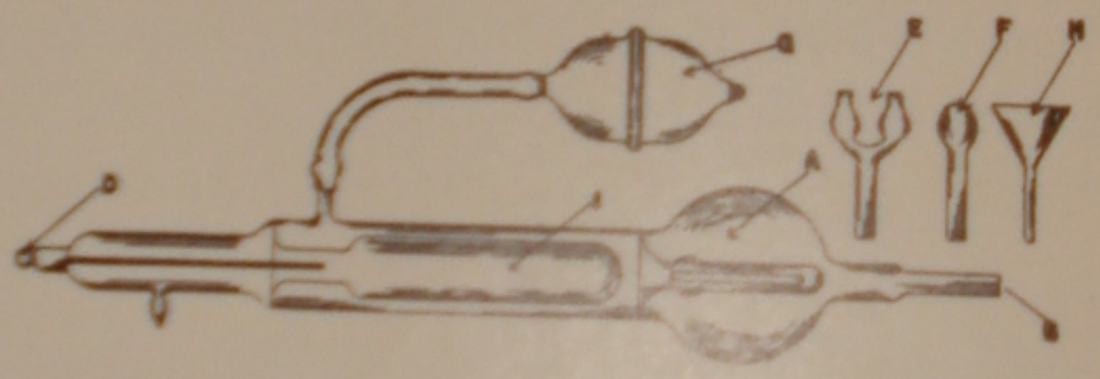
For indirect treating with the High Frequency Current.

No.		Code
53	Glass Handle	*Bismal*

Indirect Treatment Handles

No.		Code
54	Similar to No. 53, except that it is arranged to fit the No. 49 Shock Proof Handle. For Indirect Treating	*Banter*
054	Same as No. 54, but made to fit the 049 Handle	*Bantam*

Ozone Generator



An ALL GLASS Ozonizer, made in one piece. Has two compartments, one for holding the purifying oils, and a vacuum chamber to which is connected the wire from any high frequency source.

No.		Code
22	Ozone Generator, complete as illustrated, with oils	*Bidwy*
70	Rubber Bulb, only	*Ozbulc*
71	Hose Connection	*Ozhoco*
72	Mouth Piece	*Ozmopi*
73	Nose Piece	*Oznose*
74	Funnel	*Ozfunl*
75	1 oz. Bottle Pine Needle Oil	*Malmo*
76	1 oz. Bottle Eucalyptus Oil	*Malta*

Cord Tip Adapters

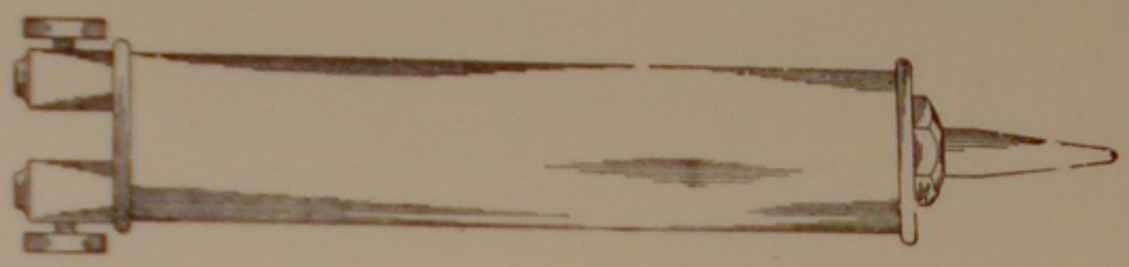
To enable operators to use cords with $\frac{3}{32}$ inch tips with apparatus having $\frac{5}{32}$ inch binding post or attachment openings, or vice-versa.



No. 1335

No.		Code
1335	Increases size of $\frac{3}{32}$" tip to $\frac{5}{32}$"	*Corter*
1336	Decreases size of $\frac{5}{32}$" tip to $\frac{3}{32}$"	*Adacor*

Eye Magnet

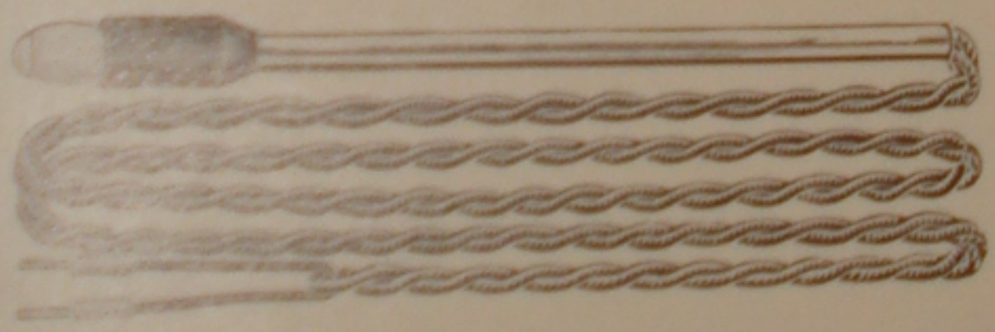


Constructed to operate from any low voltage source, up to 10 volts.

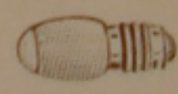
No.		Code
1368	Eye Magnet	*Acoon*

Diagnostic Illuminator and Shield

Consisting of a long metal holder, with a green silk covered connecting cord, and a specially designed opal bulb with a lens blown in the end. This focuses an intense light to the area desired.



No. 321



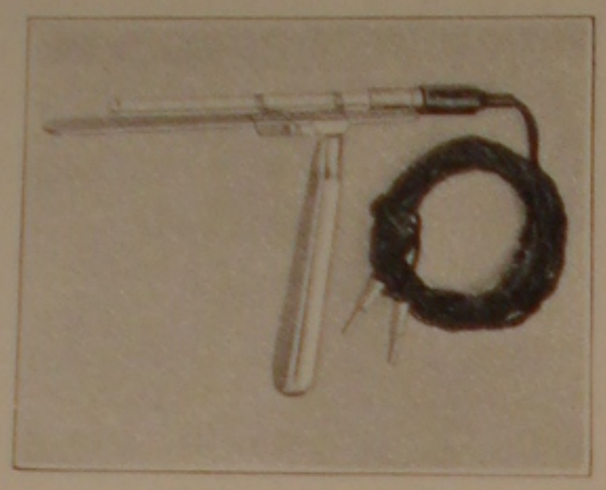
No. 322

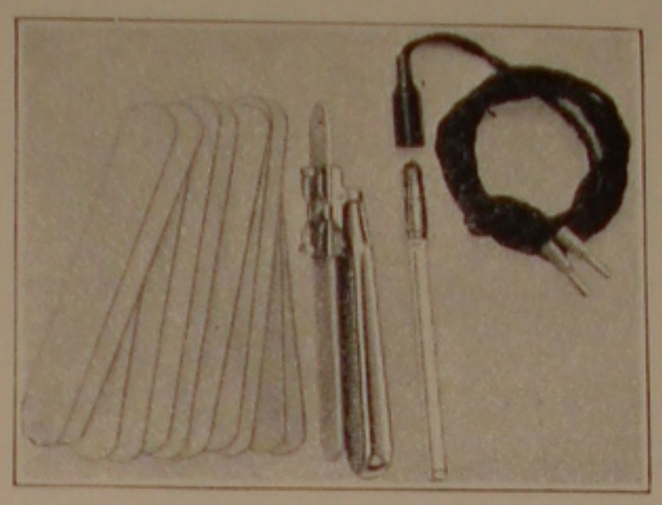


No. 324

No.		Code
321	Illuminator, complete with Tungsten lamp	*Analog*
322	Extra Tungsten bulb	*Acid*
324	Polished Nickel-plated Shield for No. 321	*Agile*

Tongue Depressor and Diagnostic Illuminator





Consisting of an aluminum handle with folding end-piece through which are slipped ordinary wooden tongue strips, twelve wooden blades, green silk connecting cord, lamp socket, opal lamp and an extra renewing lamp filler.

The special opal lamp is supported in spring clips above the wooden tongue blades, and is easily removed. This lamp throws an intense white light, properly focused.

No.		Code
335	Diagnostic Illuminator, with Cords, Holder, and Opal Lamp	*Usurp*
336	Special Diagnostic Lamp Bulb, only	*Uther*
337	Tongue Depressor, only	*Uvula*
338	Extra Wooden Tongue Blades, box of 12	*Vacat*
339	Extra Renewing Filler for Lamp	*Vacua*
340	Complete Lamp and Tongue Depressor arrangement, including Illuminator with Cords, Holder, and Opal Lamp, Tongue Depressor, 12 Wooden Tongue Blades and extra Lamp Renewing Filler	*Vague*

New Fischer Cautery Cords

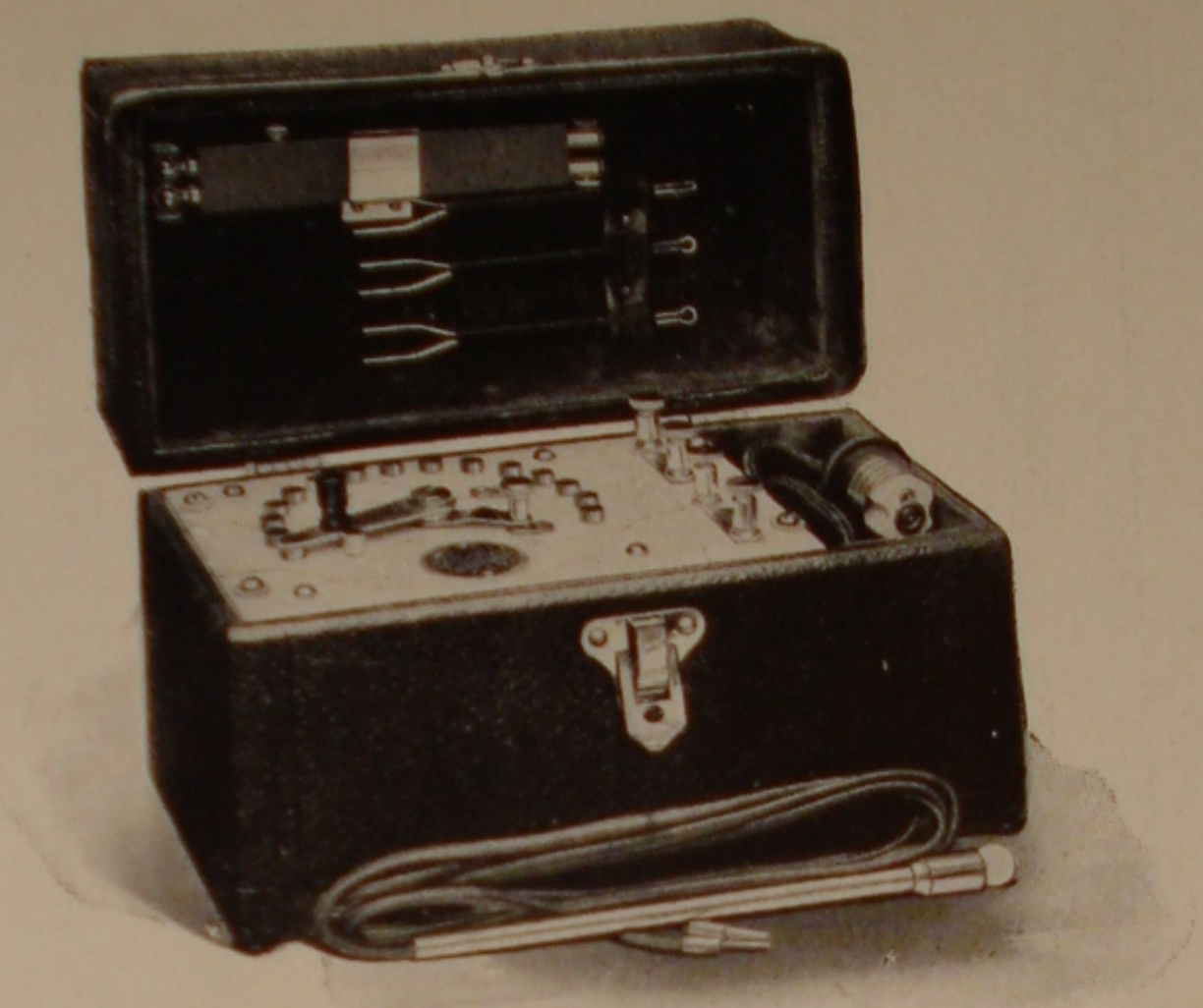
Flexible copper stranded wire, covered with pure gum rubber, replacing the former cords which were covered with mercerized webbing. May be washed and always kept clean as when new.



No.		Code
1330	6 ft. pair	*Negro*

Note: When ordering these cords for the Fischer Senior "FO," "LO," "G" or "GP" Diathermy Outfits, specify No. 1330-G, which are supplied with special tips.

Cautery and Diagnostic Transformer

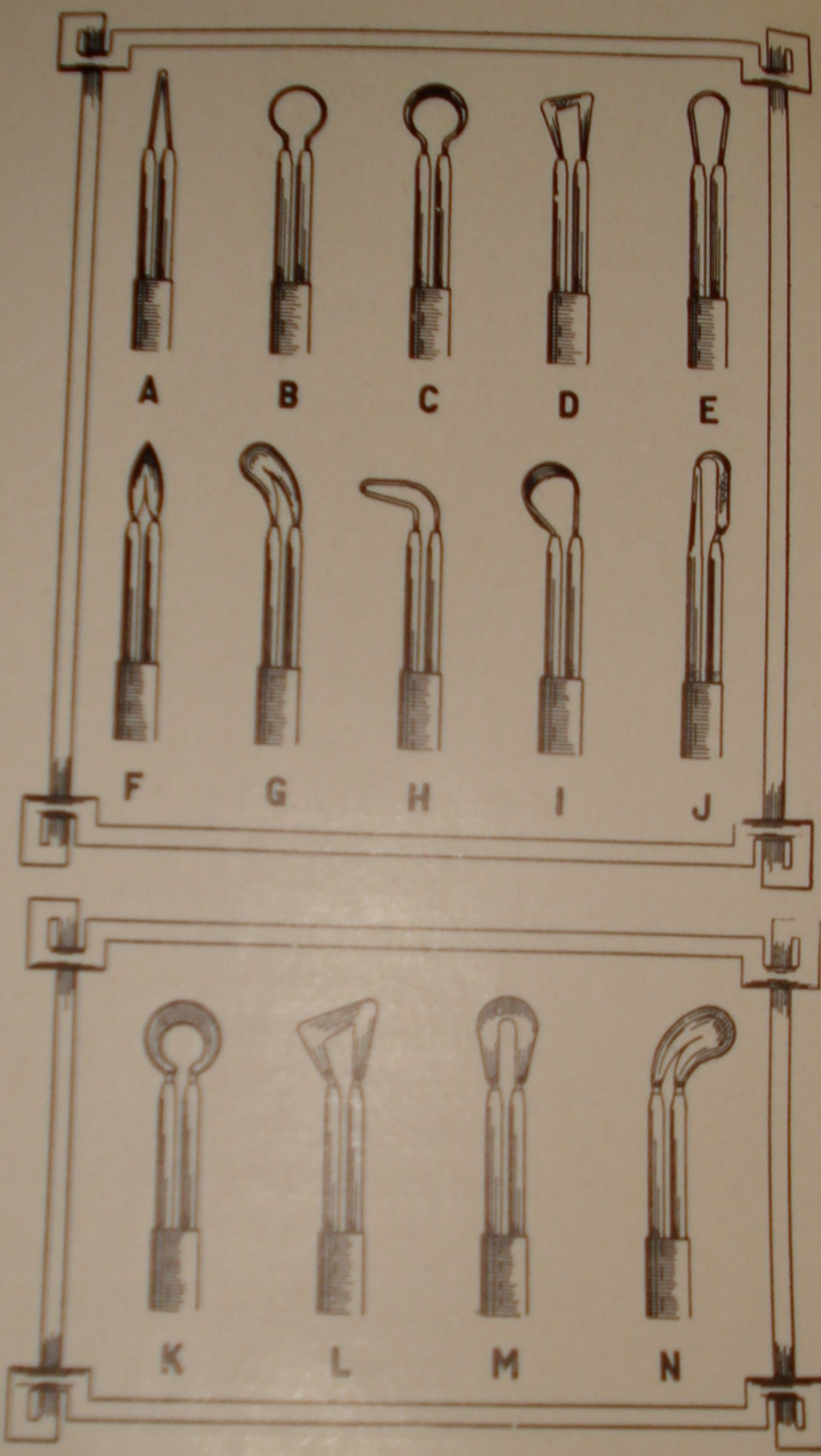


The Fischer Cautery and Diagnostic Light Transformer is a compact, neat generator of the closed-core type, consuming very little energy, yet having sufficient output to heat most any Cautery knife on the market. Has a diagnostic lamp circuit with a range of from ½ to 12 volts. Can be used with perfect safety for lighting your smallest Cystoscope bulbs, or for illuminating a 12-volt lamp if necessary. Both circuits are perfectly regulated, and durably wound. Case is covered with black leatherette. Contact buttons, regulating levers, and binding posts are of brass, heavily nickel-plated, and mounted on white marble.

No.		Code
470	Transformer only, in carrying case, with connecting cord and attachment plug, for 110 volt, 60 cycle, alternating current	*Aba*
471	Outfit with pair No. 306 Heavy Cautery Cords, 1 No. 305A Cautery Knife, 1 No. 305C, Cautery Knife, 1 No. 301 Cautery Handle, 1 No. Diagnostic Illuminator, complete	*Abaca*

For Prices see List Attached

Cautery Knives



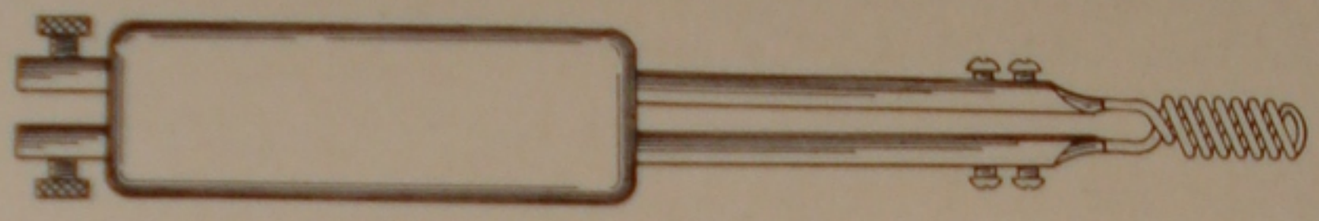
No.
305A to 305J.....
305K to 305N Heavy.....
Codes *Acmea, Acmeb, Acmec*, etc.

For Prices see List Attached

Cautery Knives

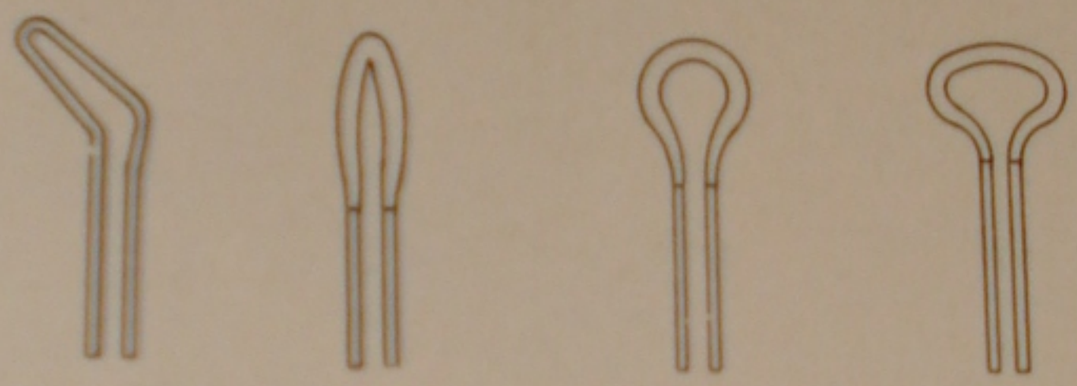
The carefully shaped knives are securely mounted into the copper bars. These knives are shaped to conform with most any requirements for all purposes. The copper bars are bound together by a special twisting process, and enameled to withstand heating and handling indefinitely. Knives are made of a special alloy, of high electrical resistance. (See page 50.)

Heavy Cautery Knives and Handle



No. 295

No. 296



No. 297 No. 298 No. 299 No. 300

No.		Code
295	Heavy Cautery Handle	*Pacero*
296	Heavy Spiral Cautery Knife	*Pachan*
297	Heavy Angular Cautery Knife	*Pacify*
298	Heavy Pointed Cautery Knife	*Packor*
299	Heavy Plain Loop Cautery Knife	*Pacton*
300	Heavy Flat Loop Cautery Knife	*Paddle*

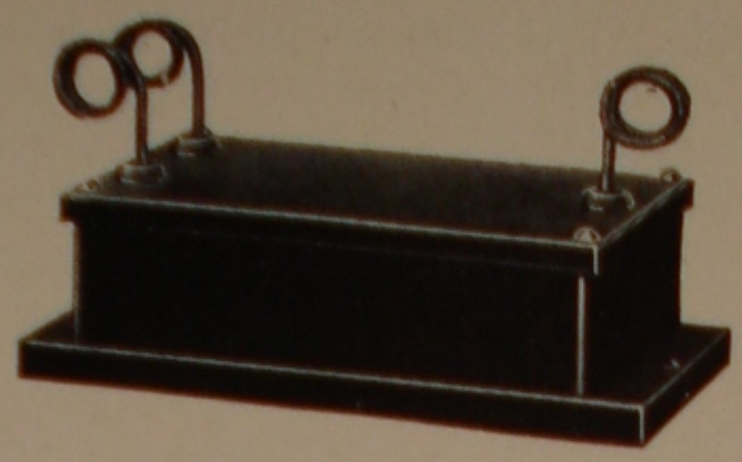
Cautery Handle



Made of a practically indestructible material. Arranged to hold the knives in any one of five positions. Has contact switch for convenience in operating.

No.		Code
301	Cautery Handle	*Acetyl*

Condenser (Static Arrester)



Used in connection with Powerful High Frequency Apparatus for protection to line. Mounted on a slat slab, in a metal box.

No.		Code
960	Condenser for A. C. lines	*Tetort*
961	Condenser for D. C. lines as used across Rotary Converters	*Recopo*

Pilot Lamp

An indicating lamp bulb used on most of our Portable and Cabinet Apparatus.

No.		Code
325	Plain Bulb	*Larrup*
326	Ruby Bulb	*Lodge*

Casters



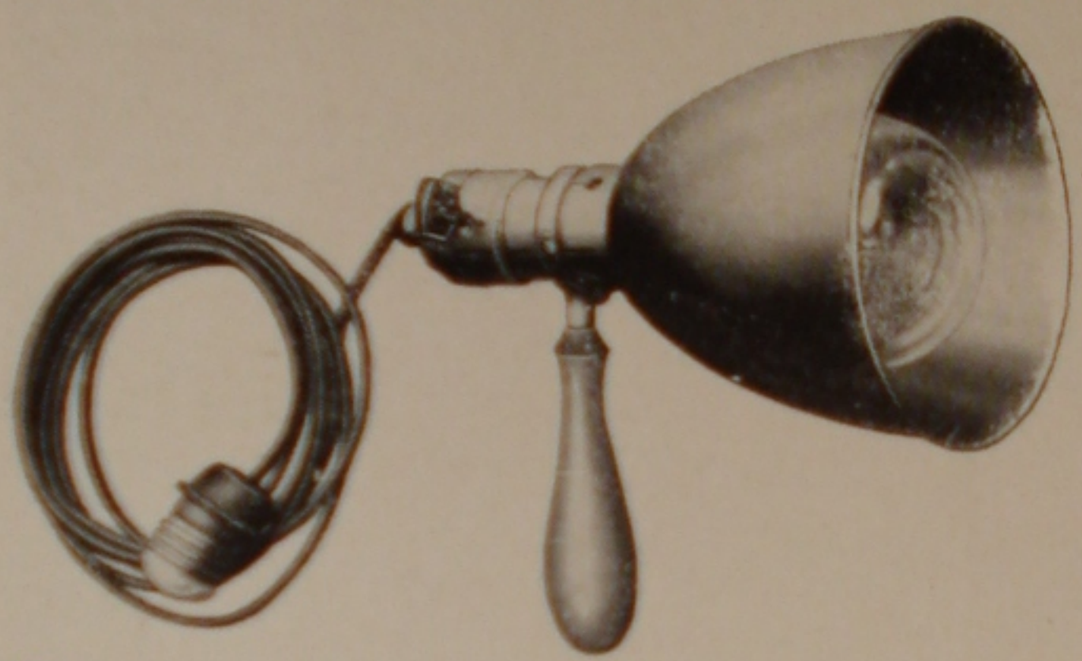
No.		Code
1260	4¾″ wheel with ⅝″ rubber face	*Cascar*
1261	2½″ wheel with 1 1/16″ felt face	*Castys*
1262	2 ″ wheel with 1 ″ fibre face	*Casfos*
1263	1⅝″ wheel with ¾″ fibre face	*Casmal*

Fischer "Radiolite"



The reflector on the "Radiolite" is made of highly polished aluminum spun to true parabolic shape, and owing to its simple clamping device, is readily removed for re-finishing at any time. The outside diameter is ten inches.

No.		Code
154	Fischer "Radiolite," 10″ Reflector Light Globe, Connecting Cord and Plug, no screen	*Hamul*



Fischer "Radiolite Junior"

Made of same material and same style as the larger lamp above, but of five-inch diameter only.

No.		Code
152	5″ Reflector with Lamp, Connecting Cord and Plug	*Hack*

Color Screens

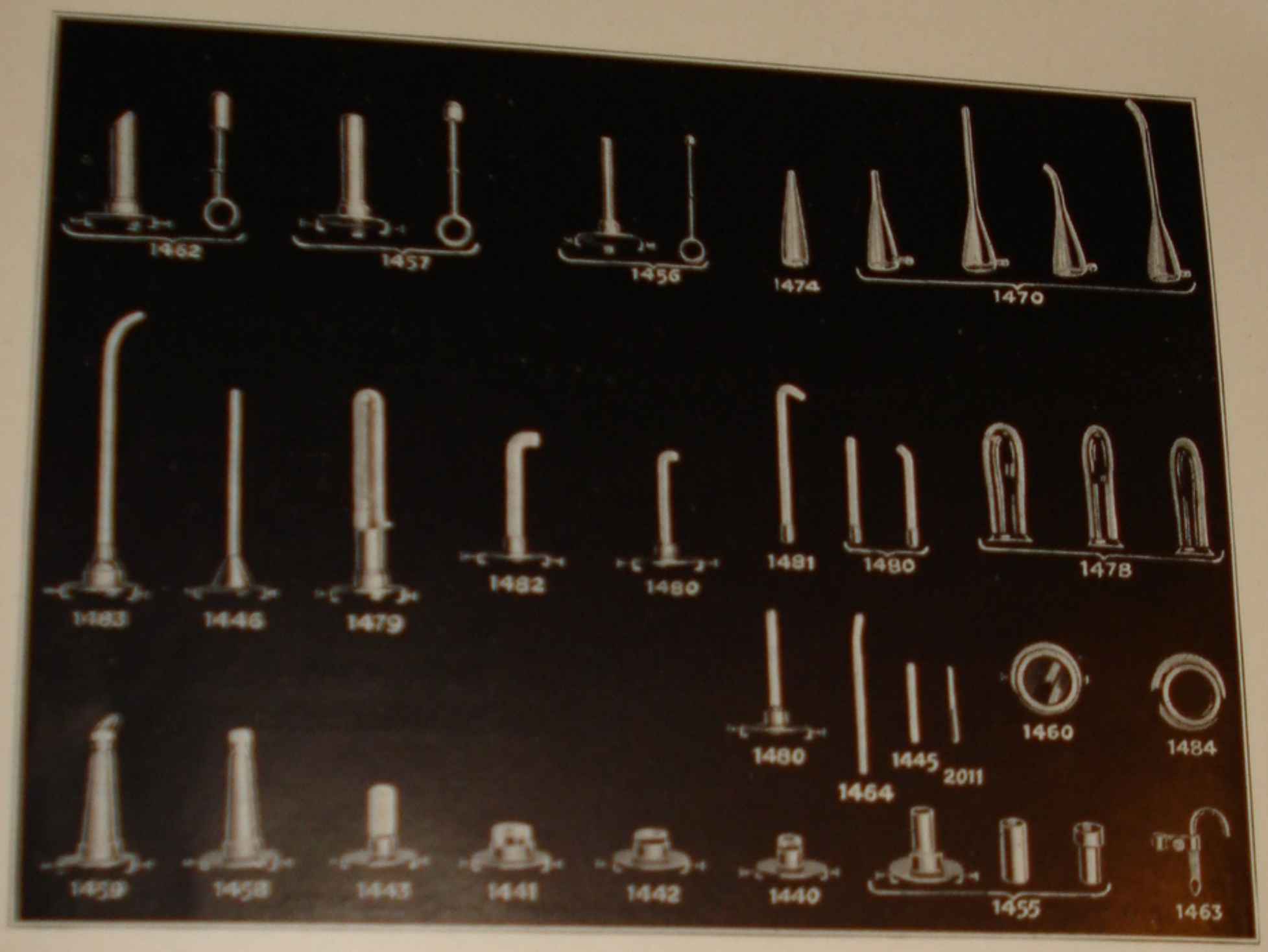
Fischer Color Screens are made of natural colored glass, not dipped only, and mounted in sections to avoid breakage from heat.

No.		Code
170	9½″ Screen, *Red*	*Helic*
171	9½″ Screen, *Blue*	*Helm*
172	9½″ Screen, *Amber*	*Helon*
173	5 ″ Screen, *Red*	*Hemat*
174	5 ″ Screen, *Blue*	*Hemic*

Bulbs for Therapeutic Lamps

No.		Code
168	Extra Bulb for 10″ Lamp	*Hegar*
166	Extra Bulb for 5 ″ Lamp	*Hectic*
181	1000-watt clear bulb	*Udder*
183	1500-watt clear bulb	*Uhase*
182	1000-watt blue "daylight" bulb	*Ugric*
184	1500-watt blue "daylight" bulb	*Uhlan*

Applicators and Spare Parts



Applicators

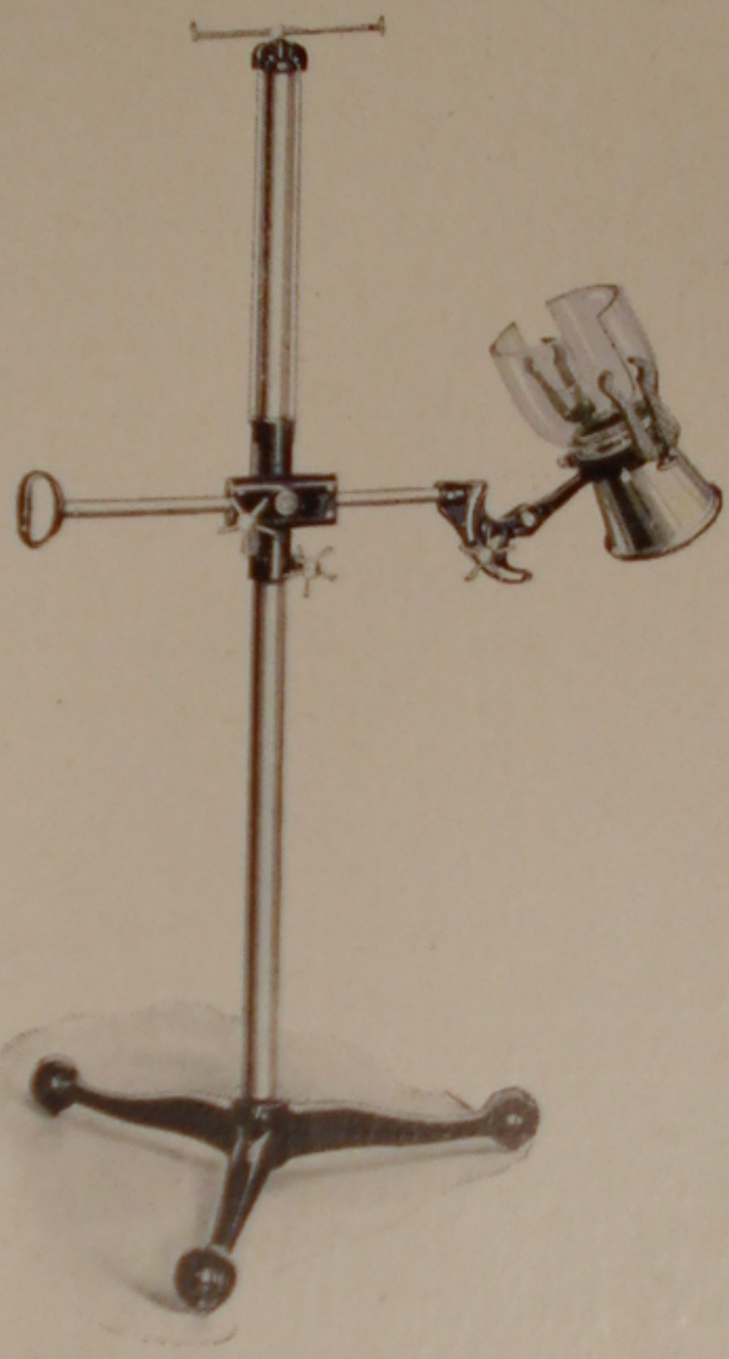
In treating certain conditions with the Kromayer or Alpine Sun Lamp, applicators have been devised. In local conditions of skin or cavity, the range of application of these lamps depends upon the variety of applicators available. In the selection one should be governed by the extent of work in which the lamp is to be used.

These applicators are made of the best grade of clear quartz which insures the greatest possible transmission of Ultra-violet light.

No.		Code
1440	Quartz Lens Applicator Rod (Small)	*Mirth*
1441	Quartz Lens Applicator Square	*Mirza*
1442	Quartz Lens Applicator Rod (Medium)	*Misty*
1443	Hemorrhoid Applicator	*Miter*
1444	Holder for Quartz Rods	*Mocha*
1445	Quartz Rod Straight End 2¾"	*Modes*
1446	Quartz Rod Shaped End 6¾"	*Modoc*
1447	Blue Ultra-violet Glass 2mm.	*Moera*
1448	Blue Ultra-violet Glass 3mm.	*Mogul*
1449	Blue Ultra-violet Glass 4mm.	*Molur*
1450	Blue Ultra-violet Glass 5mm.	*Moire*
1451	Mica Protection Window	*Molar*
1452	Weaver Applicator	*Molli*
1453	Rubber Tubing	*Moult*
1454	Quartz Window	*Monus*
1455	Sharpe Localizer and 3 Tubes	*Monad*
1456	McManus Sinus Applicator	*Mongo*
1457	Plank Proctoscope	*Monke*
1458	Plank Pharyngeal Applicator	*Monot*
1459	Baldwin Laryngoscope	*Mooch*
1460	Blue Window, Complete	*Moody*
1461	Blue Window, Less Holder	*Moose*
1462	Burrow's Prostatic Applicator	*Mopey*
1463	Ruber Tube Clamp	*Moral*
1464	Mehler Nasal Applicator	*Morin*
1465	Protection Goggles	*Mossy*
1466	Ladabeck Quartz Irrigator (Small)	*Motif*
1467	Ladabeck Quartz Irrigator (Medium)	*Motto*
1468	Ladabeck Quartz Irrigator (Large)	*Mound*
1469	Ladabeck Quartz Irrigator (Extra Large)	*Mourn*
1470	Ladabeck Quartz Irrigator (Set of 4)	*Movie*
1471	Daly Pyorrhea Applicator (Set of 3)	*Mower*
1472	Bainbridge-Lippman Applicator	*Mucky*
1474	Mayer Aural Applicator	*Mufin*
1475	Wagner Quartz Speculum (Size A)	*Muggy*
1476	Wagner Quartz Speculum (Size B)	*Mulct*
1477	Wagner Quartz Speculum (Size C)	*Muley*
1478	Wagner Quartz Speculum (Set of 3)	*Mumbl*
1479	McCaskey's Prostatic Applicator	*Mumps*
1480	Sampson Pyorrhea Applicator (Set of 3)	*Mungo*
1481	Sampson Hay Fever Applicator	*Mural*
1482	Sampson Laryngoscope	*Usage*
1483	Quartz Urethral Applicator	*Usbek*
1484	Alpine Kromayer Applicator Adapter, to attach Quartz applicators to the Alpine Lamp—Furnished free of charge	*Usher*
1486	Ashland Universal Pyorrhea Applicator	*Varixx*

Fischer Compression and Protection Tube Stand

Our No. 1005 Tube Stand combines protection to the operator and patient with perfect ease of adjustment.



No. 1005 Fischer Tube Stand

A rigidly constructed Lead Compression Cone 6″ in diameter is furnished, above which Aluminum Filters can easily be attached. The guide for the high tension cords is sufficiently long and mounted on a swivel support. The base being mounted on large free rolling Casters, it is easily the most complete, adaptable Tube Support obtainable.

The finish is in heavy nickel-plate and black enamel. Mahogany finish will be furnished at the same price on request, and other special enamels at a slight additional cost.

No.		Code
1005	Fischer Stand, as illustrated	*Dossil*

Lead Lined Compression Cones



No. 1009



No. 1051

No.		Code
1009	Lead Lined Cone—5½″ diameter	*Dura*
1050	Lead Lined Cone—3 ″ diameter	*Buret*
1051	Lead Lined Cone—8 ″ diameter	*Burn*

Lead Lined Treatment Cones



No. 1070



No. 1071



No. 1072



No. 1073

No.		Code
1070	Treatment Cone, 1″ opening	*Holz*
1071	Treatment Cone, 2″ opening	*Horn*
1072	Treatment Cone, 3″ opening	*Hovus*
1073	Treatment Cone, 4″ opening	*Huet*

Special Support For Coolidge Radiator Tube

An ingenious arrangement to replace the regular cross-arm on the No. 1005 Tube Stand when the Radiator type of Coolidge X-ray Tube is to be used. Adaptable to any angles—easily adjusted—sturdily constructed.



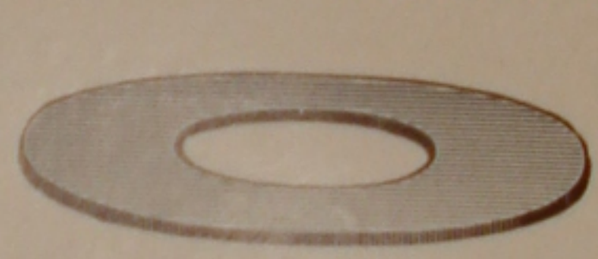
No. 1075 Complete as illustrated, with Leaded Glass Shield..... Code *Dostyr*

Lead Diaphragms

Made of heavy sheet lead, arranged to slip in the cone holder on the Tube Stand, directly over the cone. Furnished with two sizes holes.



No. 1007



No. 1008

No.
1007 Lead Diaphragm 1″ hole ..... Code *Doom*
1008 Lead Diaphragm 2″ hole ..... *Dory*

Aluminum Filters

Made of pure Aluminum, 1 mm. thick. Either 1, 2 or 3 thicknesses can be inserted over the cone on No. 1005 Tube Stand, enabling the operator to use the proper amount of filtering resistance between the X-ray Tube and the patient.



No.
1006 Aluminum Filter, 1 mm. thick..... Code *Donga*

Lead Glass Bowl



Made of moulded glass, containing about 50% lead, affording excellent protection to the operator. Large enough to accommodate either 6″ or 7″ X-ray tubes. This bowl is furnished on our Compression Stand No. 1005.

No.		Code
1015	Protection Bowl	*Gord*

Head Rest or Plate Support

Arranged to fit our Protection Stand No. 1005. An exceedingly handy arrangement for supporting plates while making radiographs of extremities and for all forms of head work. Very practical for Dentists. The supports are all metal, partly enameled and nickel-plated to match the balance of the stand. The top plate is of wood, with a canvas band and clamp to hold down the part to be radiographed. Easily adjusted to any position.

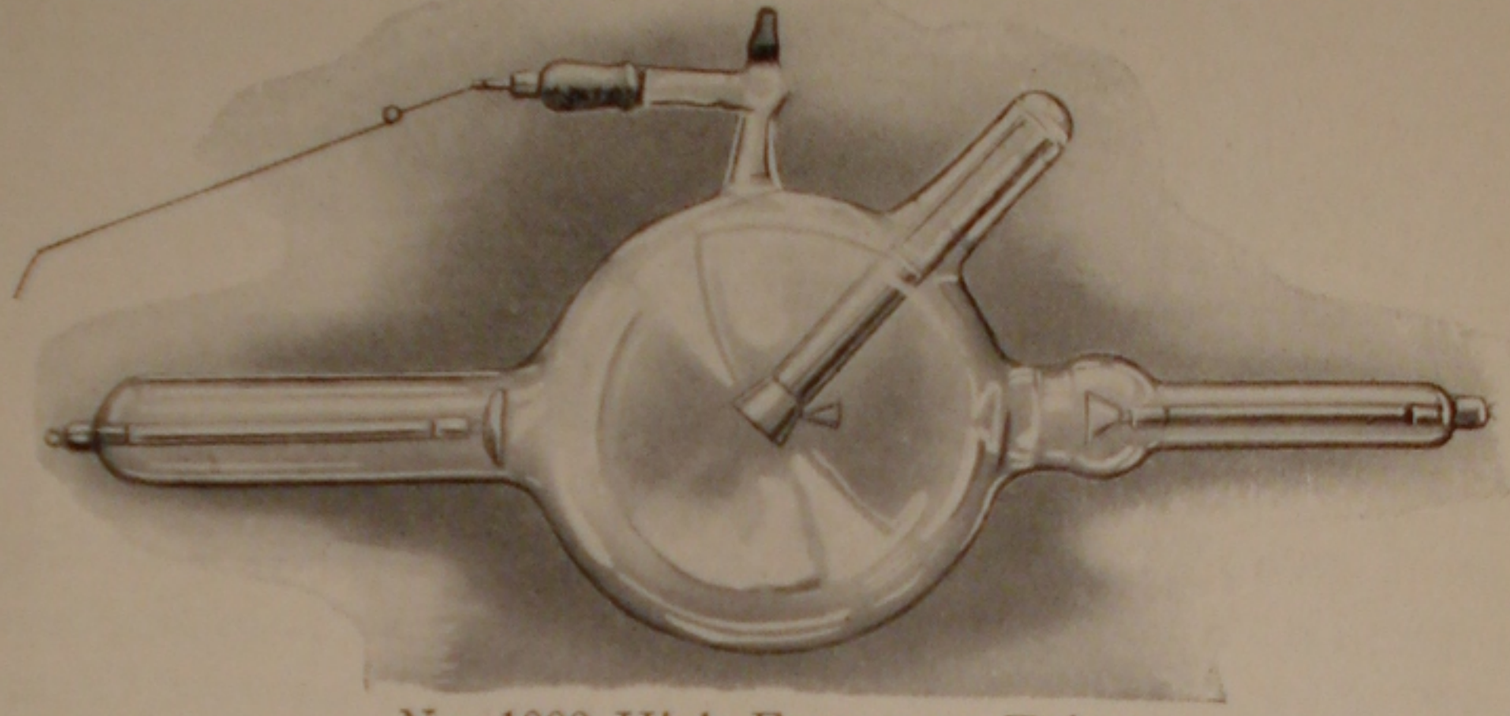


No.		Code
975	Plate Support, black or mahogany	*Dolor*

"Gas" X-Ray Tubes

We have a well equipped factory for the manufacture of all types of X-ray and High Frequency Tubes, with an efficient corps of experienced glass blowers. This enables us to supply the best possible tubes with the least possible delay.

Specify whether Tungsten or Platinum Targets are desired.

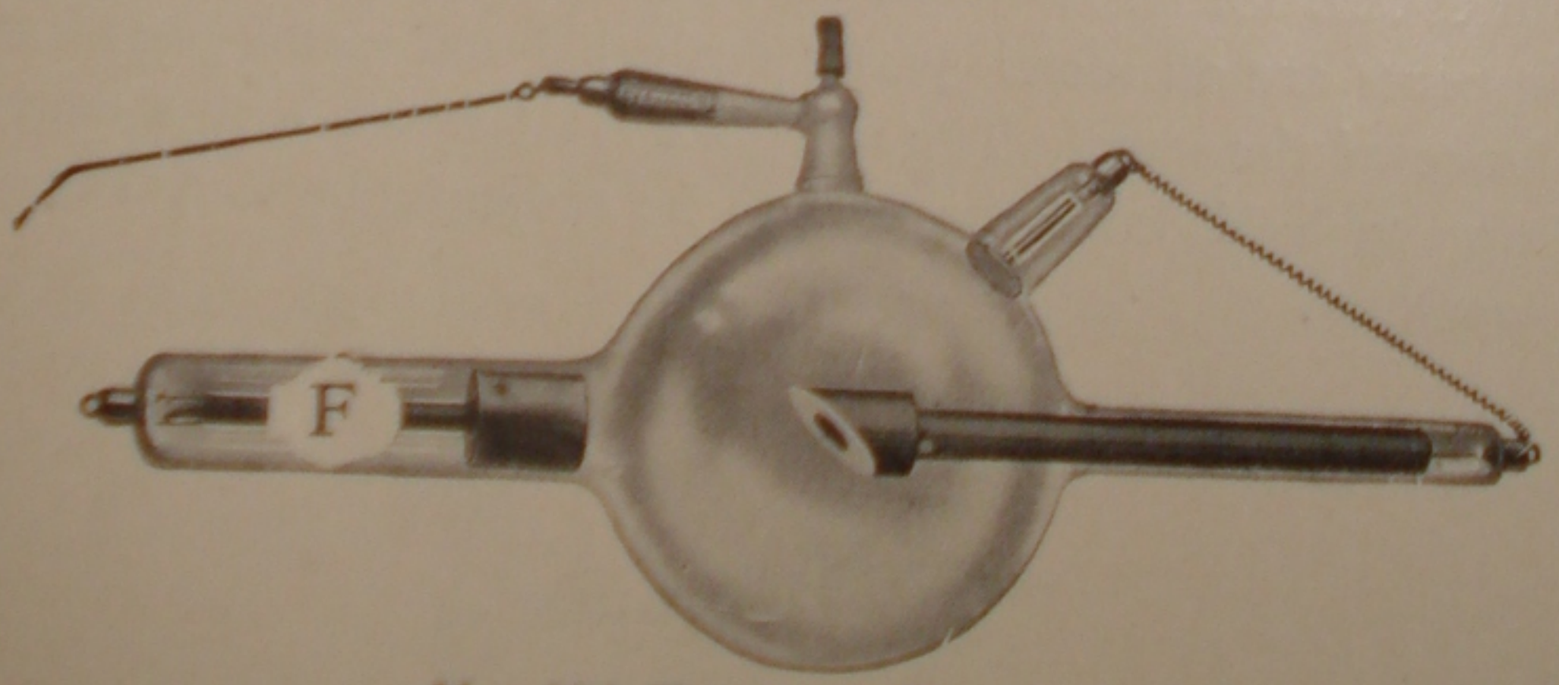


No. 1000 High Frequency Tube

High Frequency X-Ray Tubes

No.	Size	Kind	Code
1000	6″	Platinum Target	*Edea*
999	7″	Platinum Target	*Educt*
998	6″	Tungsten Target	*Eigon*
997	7″	Tungsten Target	*Eiloid*

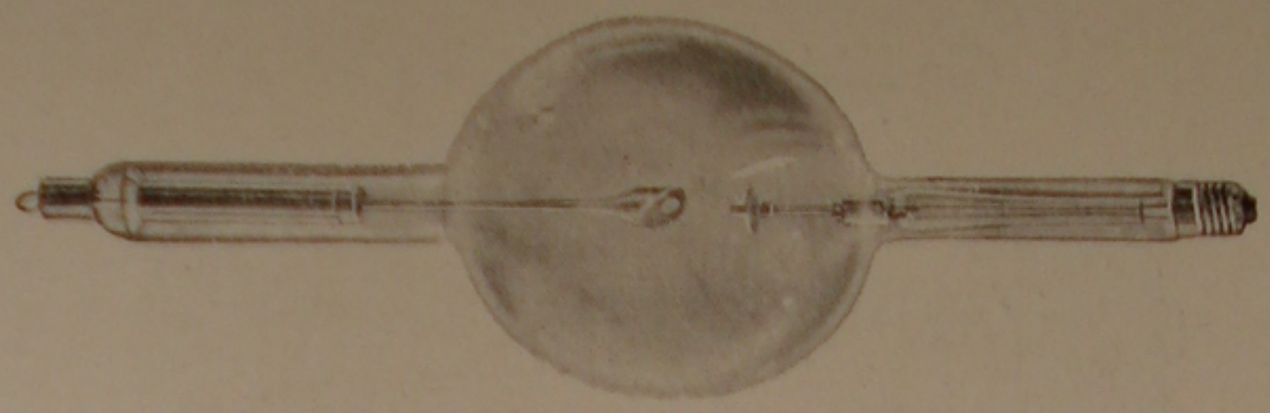
Transformer X-Ray Tubes



No. 994 Transformer Tube

No.	Size	Kind	Code
993	6″	Tungsten Target	*Elbow*
994	7″	Tungsten Target	*Elder*

Coolidge X-Ray Tubes

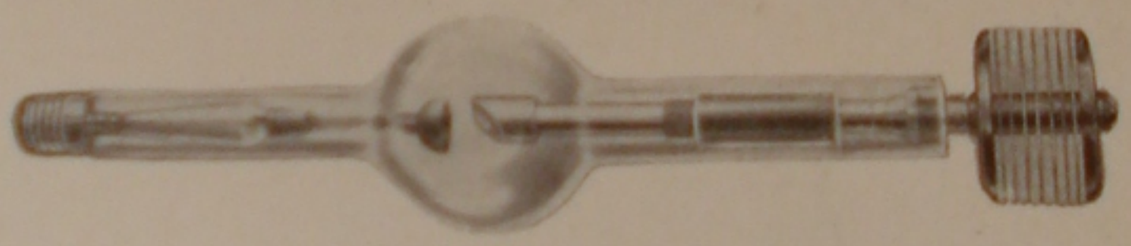


7-Inch Coolidge Tube

The *7″* Coolidge Tubes as illustrated herewith are made with three sizes of focal spots, and, as the size of the focal spot determines the allowable energy input, this point should be taken into consideration when ordering.

No.	Size	Kind	Code
1057	*7″*	Fine Focus Coolidge Tube	*Celery*
1058	*7″*	Medium Focus Coolidge Tube	*Ceke*
1059	*7″*	Broad Focus Coolidge Tube	*Cacal*

The "Radiator" Type Coolidge Tubes



Radiator Type Coolidge Tube

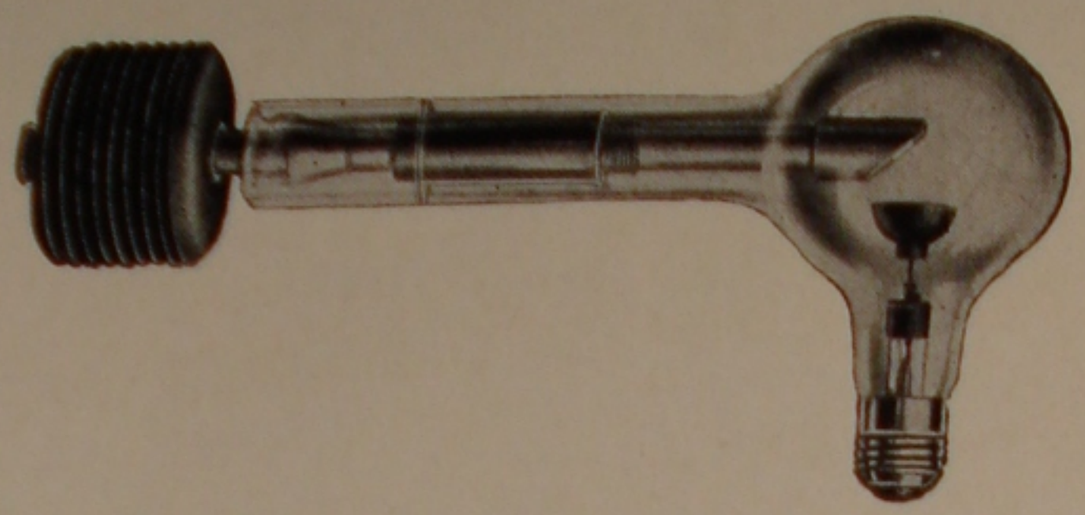
The Radiator type of Coolidge Tube is characterized by its exceptionally *fine focus,* and this fine focal spot insures the very essential definition of image on which the highest standards of diagnosis depend.

No. 1055 10 M. A. Tube is exceptionally adapted for rental purposes and with double screens and Duplitized films, most excellent negatives of any part of the body are easily made.

No. 1056 will take current discharges up to 30 M. A. at a 5″ spark gap, but has a somewhat broader focus.

No.		Code
1055	Coolidge Tube (Radiator Type)	*Celom*
1056	Coolidge Tube (Radiator Type)	*Cedron*

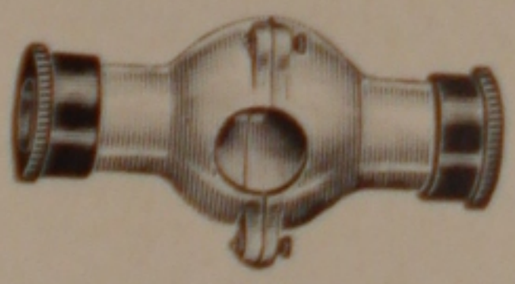
Radiator Dental Type Coolidge X-Ray Tube



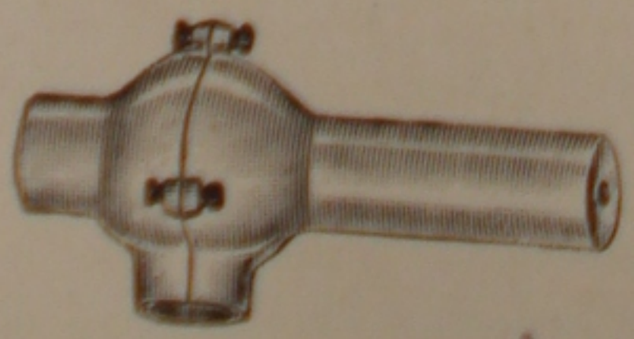
The Radiator Dental Type Coolidge X-ray Tube is designed for dental work and is furnished for use only on types of apparatus which are specially designed for operating this tube.

No.		Code
1054	Radiator Dental Coolidge X-ray Tube	*Cella*

Leaded Glass Shields For Coolidge Tubes

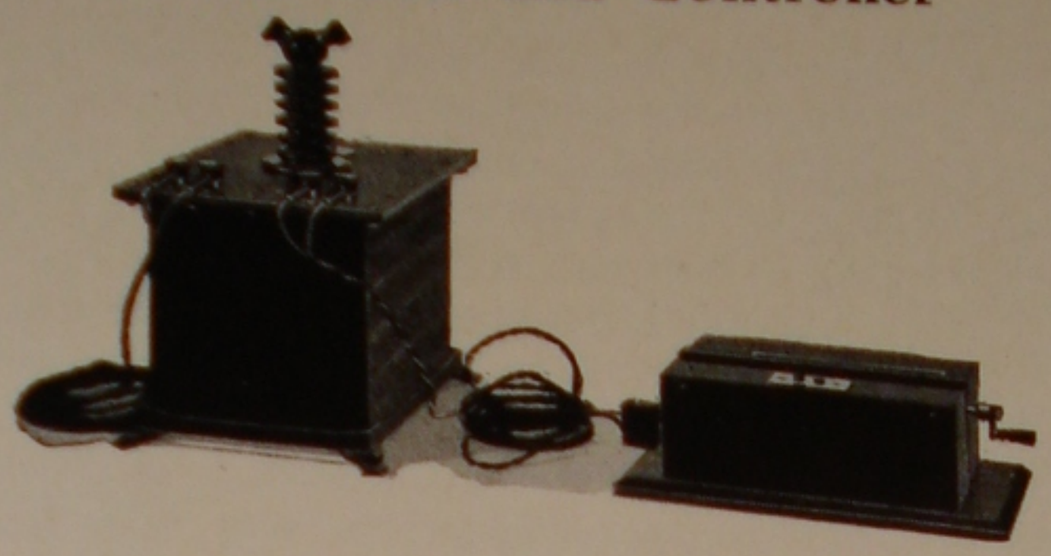


No.		Code
1013	Leaded Glass Shield or Cover for the Radiator Type Coolidge Tube—either the 10 or 30 M. A.	*Gaddo*



No.		Code
1014	Leaded Glass Shield for the Right Angle Dental Coolidge Tube	*Gorget*

The Coolidge Filament Transformer and Controller

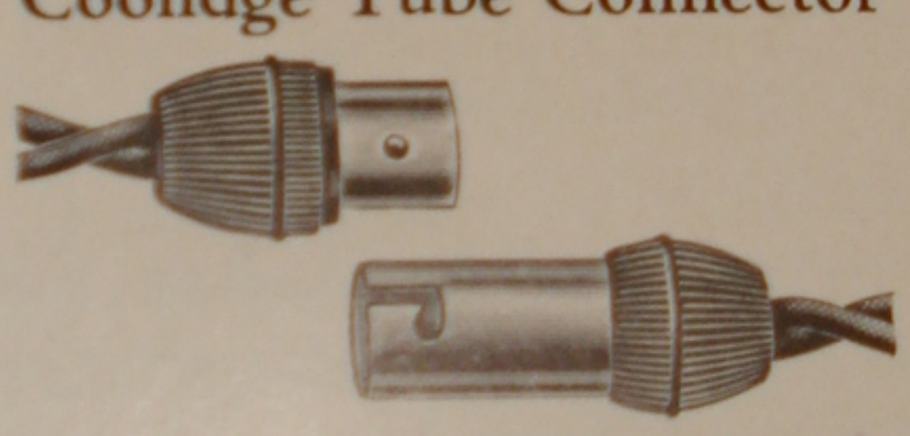


No.		Code
1060	Coolidge Filament Transformer, 110 Volt, 60 Cycle—with Metal Base—Mahogany Finish	*Cardia*
1061	Controller for No. 1060 Transformer	*Cardin*

For Heating Coolidge Filament on Direct Current

No.		Code
950X	Rotary Converter, 110 Volts D. C. to 110 A. C.	*Emolo*
955X	Rotary Converter, 220 Volts D. C. to 110 A. C.	*Epul*

Coolidge Tube Connector



Makes positive contact. Bayonet and slot lock together firmly.

No.		Code
1066		*Baycon*

Supporting Shelf For Filament Transformer



No.		Code
1064	Wood Shelf finished in polished mahogany	*Coshel*

Repairing and Rebuilding X-Ray Tubes

When an X-ray tube has become punctured, the minute hole can usually be sealed over and the tube re-exhausted. When a tube has been over-reduced and the usual method of careful, repeated warming and cooling does not serve to raise the vacuum back to normal, re-exhausting is necessary. When the terminal ends are cracked in such a way that they can be re-sealed, repairs will be made at the same price as ordinary punctures. However, where cracks are beyond repair, rebuilding will be necessary. In rebuilding, we use only the anode of the old tube. This is placed in a new bulb, with new cathode and regulator, and the finished article as returned to you will work as well as a new tube.

X-ray Tubes for repairing should be sent to us by parcel post or prepaid express. Package should be carefully marked and Express Company informed that same contains a valuable X-ray Tube. This will insure its receiving careful handling.

Prices For Repairing

We cannot guarantee good results from *repumped* X-ray tubes, especially when the glass bulb itself is blackened. When the bulb shows discoloration it is advisable in most all cases to have the tube *rebuilt*.

For prices on re-exhausting, repairing puncture and complete rebuilding, see last page of price sheet.

Repairing Coolidge X-Ray Tubes

It is impossible to quote repairs on Coolidge Tubes without returning them to the factory. Write us for details.

Wooden X-Ray Tube Racks



No.	Size	Code
375	To accommodate 2 tubes—Mahogany Finish	*Echo*
377	To accommodate 2 Radiator Type Coolidge Tubes—Mahogany Finish	*Echoco*

Fischer X-Ray Meters



No. 446



No. 447

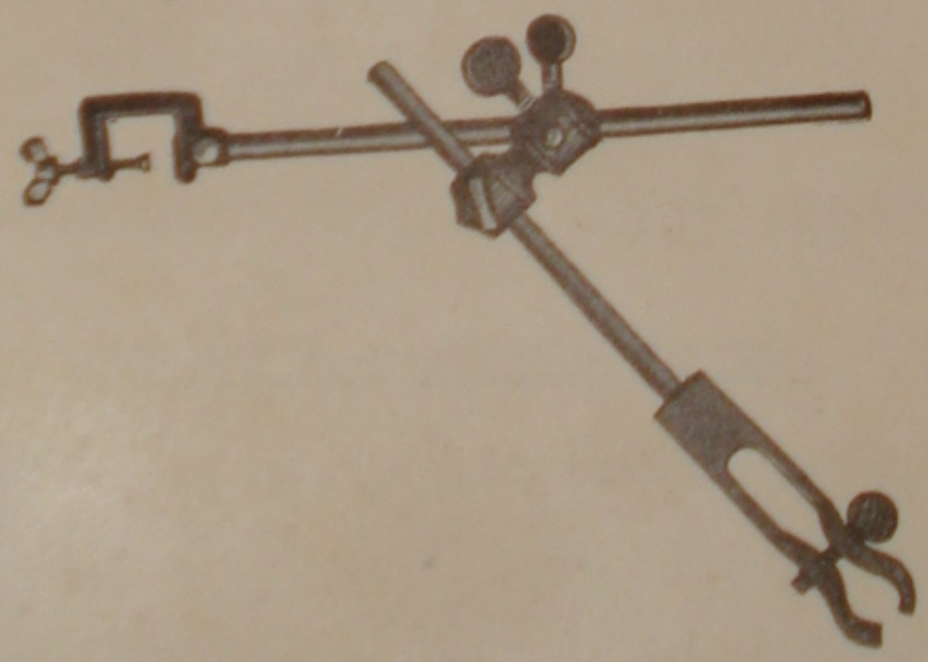
No.		Code
445	Meter calibrated from 0 to 15 M. A.	*Extyer*
446	Meter calibrated from 0 to 60 M. A.	*Extobe*
448	M. A. Meter calibrated from 0 to 15 (High Frequency)	*Eurot*
458	Spark Meter, as used on the Fischer "2B" X-ray Transformer	*Exspar*

Fischer Coolidge Ammeter

No.		Code
447	Ammeter with 6″ Face—0 to 5 Amperes	*Coamer*

Tube Support for Portables

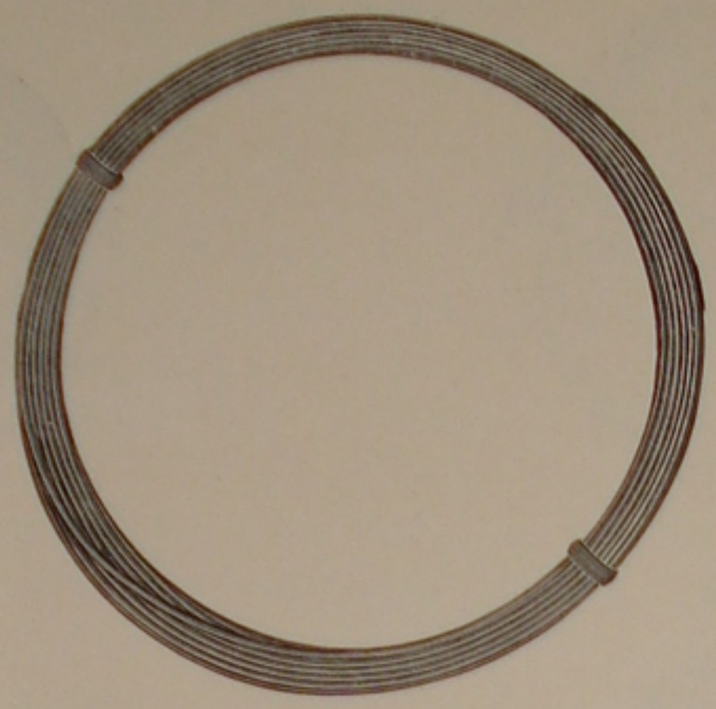
A sturdy wooden support, set in an iron clamp, and arranged to be used with Portable X-ray Outfits for bedside work.



No. 1001 Tube Support

No.		Code
1001	Tube Support with Iron Clamp	*Dumb*
1001E	Tube Support as arranged for Style "E" Cabinet	*Ingot*

Copper High Tension Wire



Soft copper wire, smooth and easily mounted in place, No. 12 gauge.

No.		Code
703	Soft Copper Wire, foot	*Carbo*

End Boards



End Boards for supporting overhead wiring, arranged with four hooks for both Gas and Coolidge Tubes.

No.		Code
1721	Mahogany finish, 4 hooks	*Inlaid*

High Tension Wall Insulators

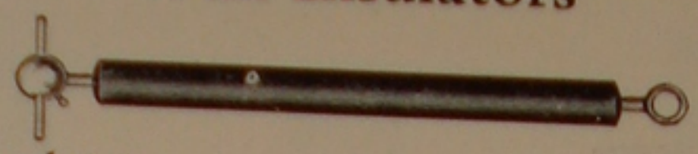


Made of hard rubber, with metal screw eye in each end. Neat and well finished.

No.		Code
700	Rubber Insulators	*Canal*

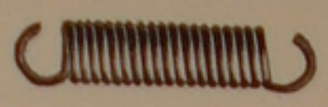
For Prices see List Attached

Turnbuckle High Tension Wall Insulators



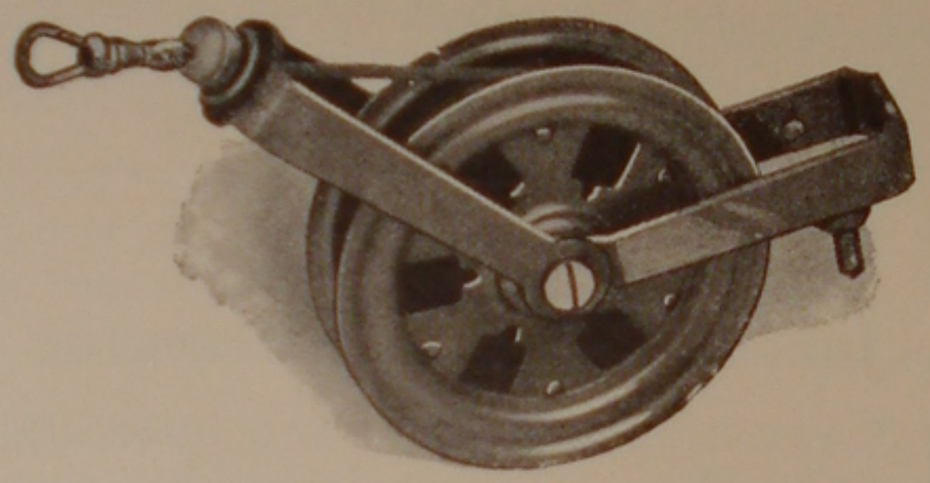
No. 701 Turnbuckle Insulator ..... Code *Cancer*

Tension Spring for Overhead Wiring

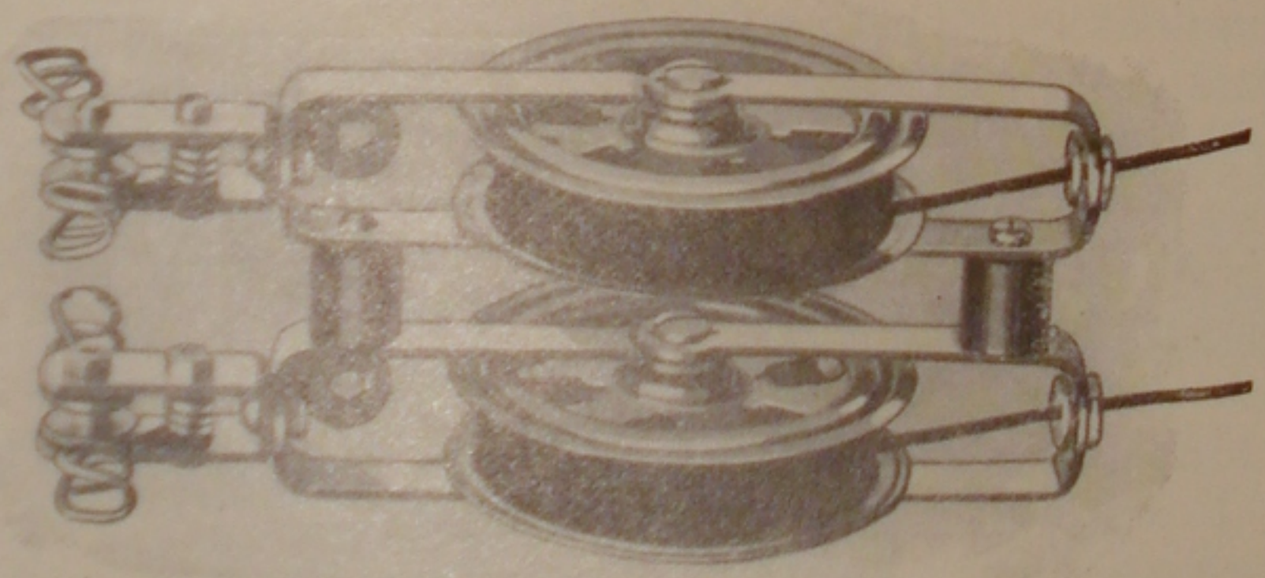


No. 705 ..... Code *Tening*

Fischer Rewind Cord Reels



No. 528 Fischer Reels ..... Code *Fagin*



No. 531

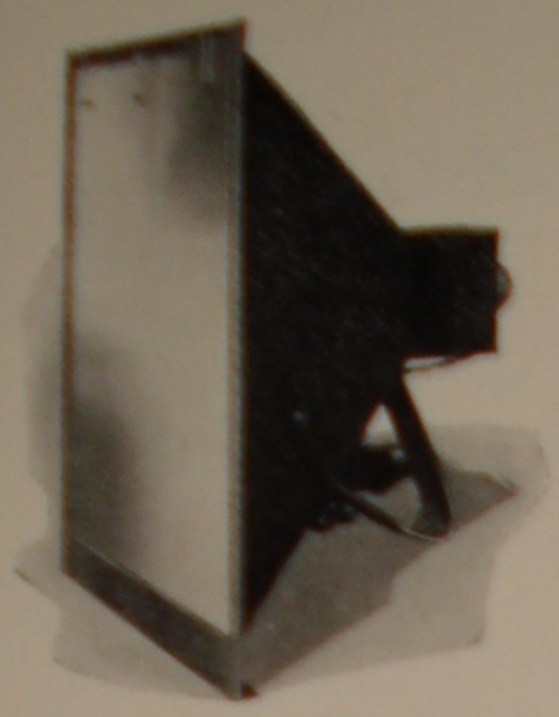
530 Single Fischer Reel, with green silk covered wire, arranged with trolley wheel for overhead wiring..... *Hemoid*

531 Double Fischer Reels, covered same as No. 530, with trolley wheels, with bare end cords, each set..... *Hemp*

532 Single Fischer Reel, same as No. 528, but with silk covered wire ..... *Hoist*

525 Trolley Reel Sliding contacts only, each..... *Hutt*

X-Ray Negative Illuminators



No. 555



No. 551

100-watt frosted blue mazda is recommended but is not furnished.

No.		Code
555	14x17″ Illuminator	*Darest*
556	Glass front only, for No. 555	*Restas*

Junior Negative Illuminator

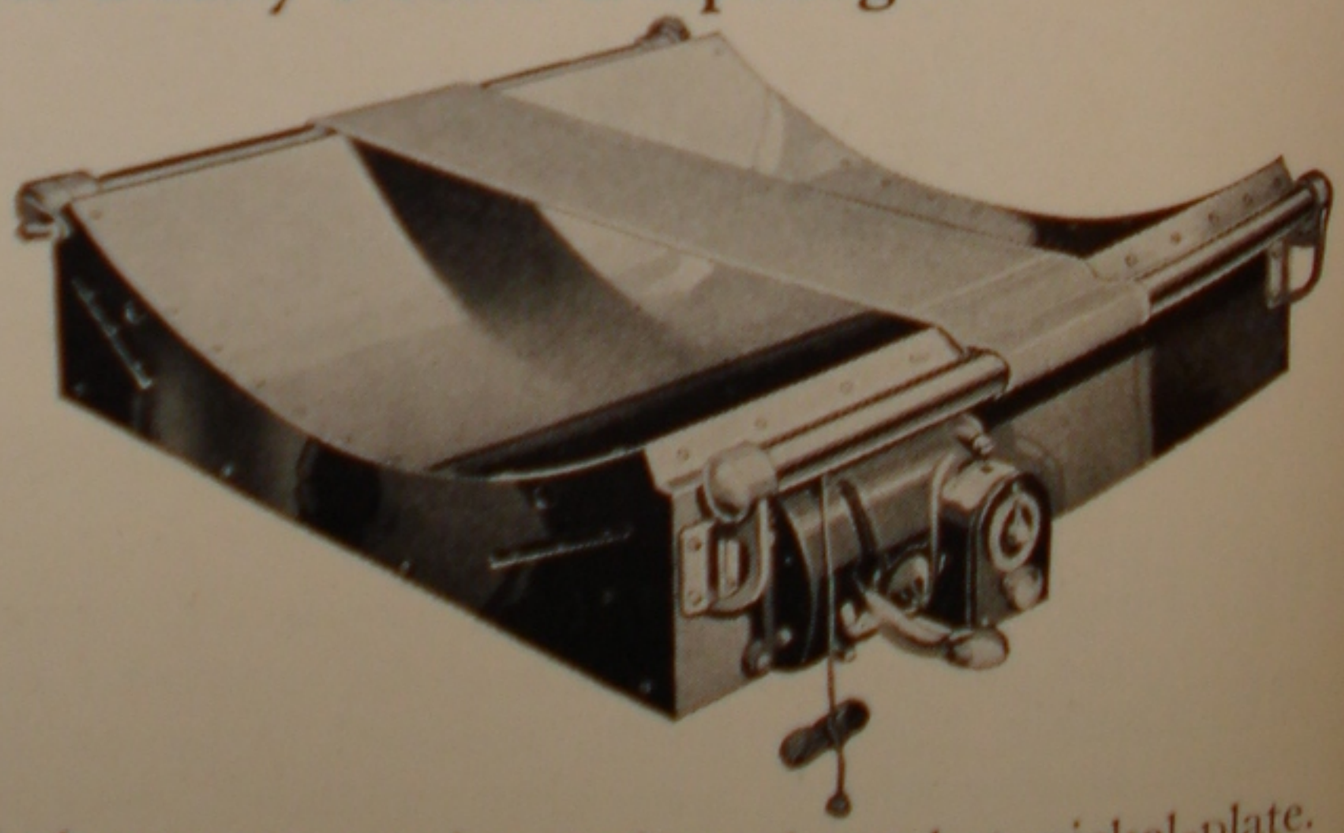
For examining X-ray negatives up to and including 8″x10″. Frame made entirely of metal. Has opal glass front, insuring a perfect lighted surface for diagnostic purposes. Tungsten lamp illumination.

No.		Code
551	Illuminator—8x10″	*Dartos*
552	Glass front only, for No. 551	*Tosdar*

Fischer Bucky-Potter Diaphragm

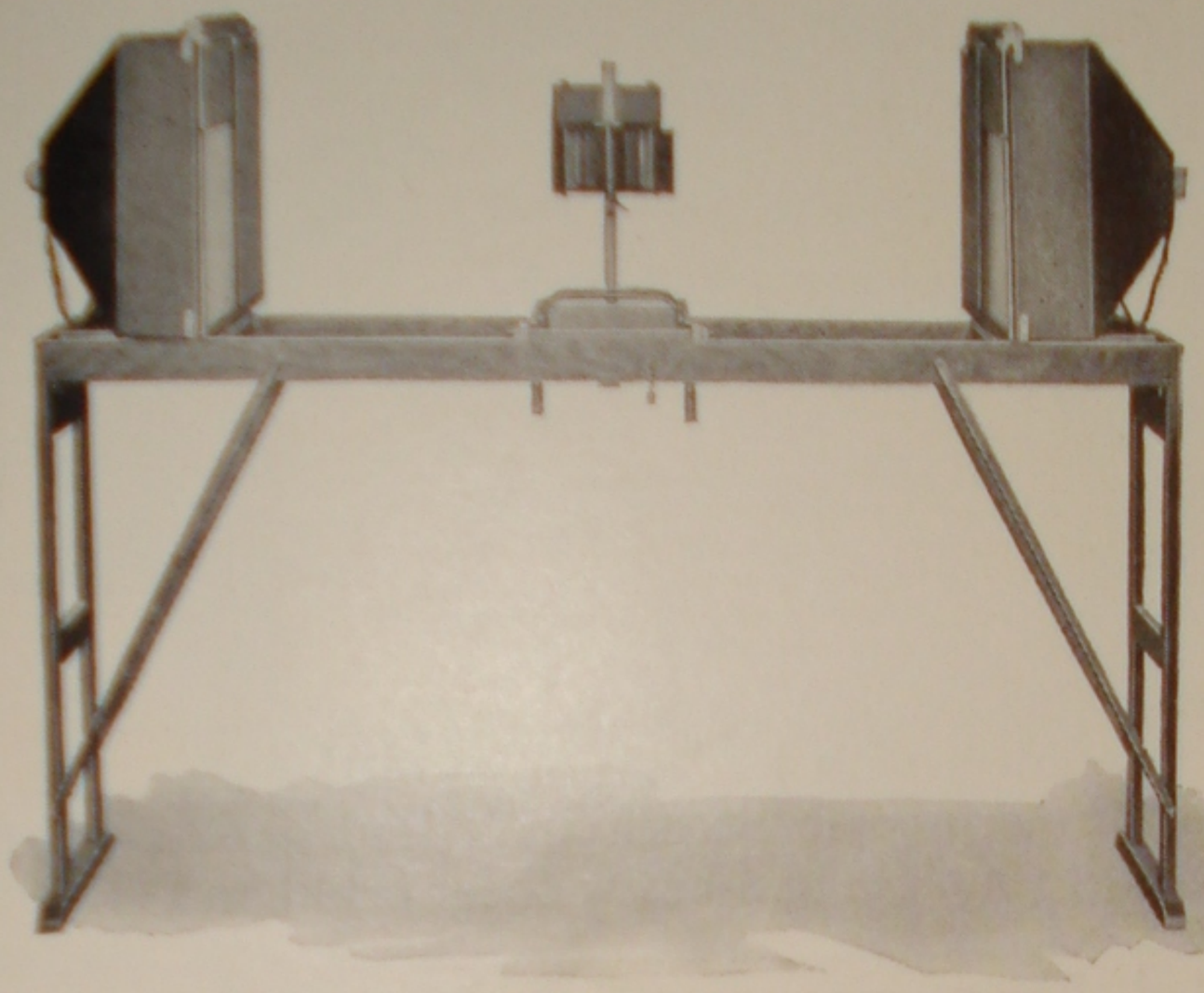
The timing element has sufficient range to include all practical exposures: 1 second to 30 seconds. Perfect compression is obtained during exposures.

The box top is made of four-ply mahogany; motor and timing device, aluminum and nickel-plate; compression rods and ratchet nickel-plate.



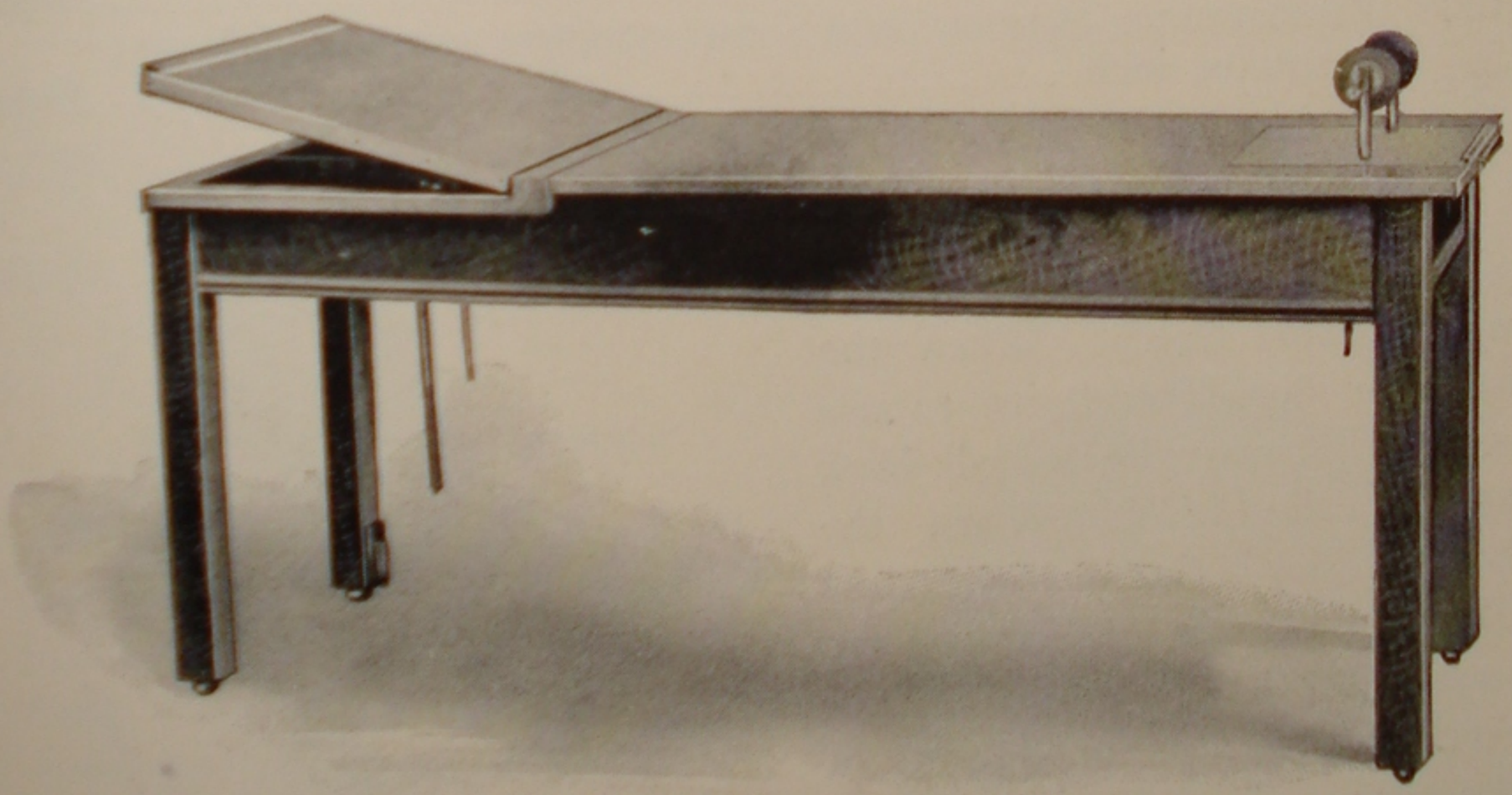
No.	Code
1080	*Bucdip*

Wheatstone Stereoscope



No.		Code
649	Wheatstone Stereoscope	*Lapid*

Fischer Plain Radiographic Table



No.		Code
642E13	Table complete, with one 17x17 Plate Changer	*Lament*
643	Extra Plate Changing Tray	*Lammas*
644	17x17 Cassette for Intensifying Screen	*Lanary*

Fluoroscopes

Finest quality Calcium Tungstate Fluoroscope Screen, mounted in a handsome black leatherette covered box; has heavy roll of fur around eye piece making it absolutely light proof.



No. 1020 Fluoroscope

No.		Code
1020	Mounted 5″x7″	*Drain*
1024	5″x7″ Mounted, with lead glass protection	*Dulpro*
1025	Mounted Fluoroscopic Screen with lead glass protection over entire surface and heavy sheet lead hand protector. Size 5″x7″	*Dull*
1026	Mounted Fluoroscope, same as No. 1025, but with 8″x10″ Screen	*Dulryo*
1021	Screen only 5″x 7″	*Drench*
1022	Screen only 8″x10″	*Duct*
1023	Screen only 10″x12″	*Dulcin*
1017	Screen only 11″x14″	*Dutch*
1018	Screen only 12″x16″	*Dyad*
1019	Screen only 14″x17″	*Dyne*
1027	Fluoroscope Screen only, best quality, same as above; square inch	*Dram*

Patterson Operating Fluoroscope

Held in place before the eyes with elastic bands. When the operator does not desire to use screen it may be tilted back against the head. When the box is tilted back a piece of ruby glass automatically falls down in front of the eye piece, protecting the accommodation of the eyes.



No.		Code
1031	Equipped with 5″x7″ Patterson Fluoroscopic Screen and heavy Lead Glass protection	*Patflu*

Fluoroscopic Screens—Mounted



Fluoroscopic Screen, Mounted

Fluoroscopic Screens, mounted in polished hard wood frames, with sheet lead insert, covered with heavy lead glass, and with protected metal hand clasps.

No.		Code
1036	10″x12″ Screen and Frame	*Quaint*
1037	11″x14″ Screen and Frame	*Qualm*
1038	12″x16″ Screen and Frame	*Quanum*
1039	14″x17″ Screen and Frame	*Quarry*

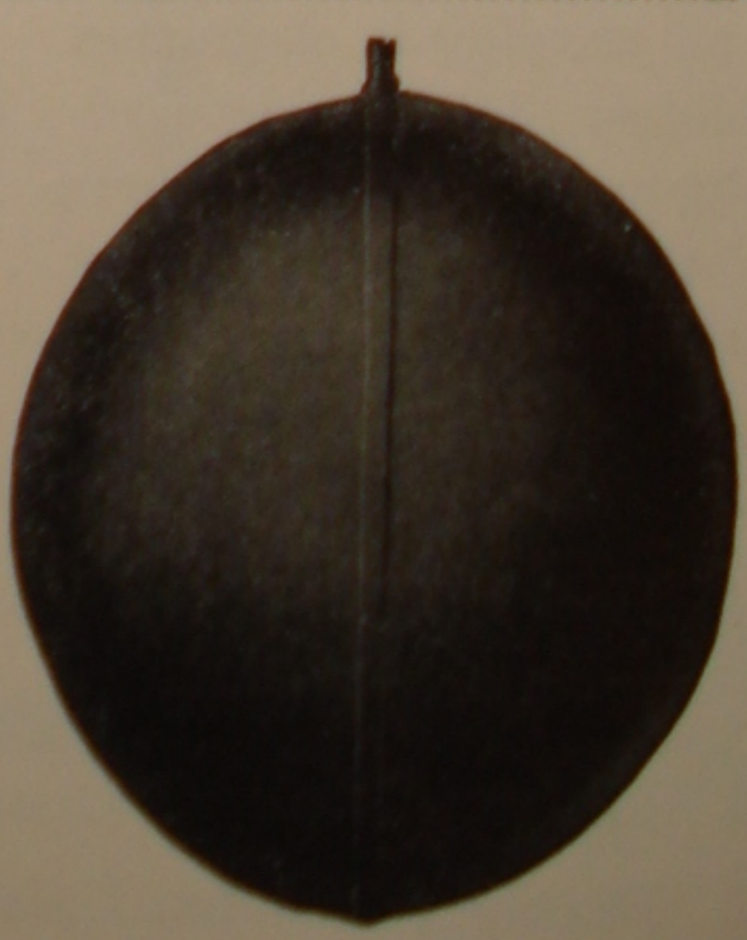
Counterweights for Fluoroscopic Screens

No.		Code
1029	Counterweight for 11x14″ Fluoroscopic Screen and Frame	*Leak*
1030	Counterweight for 14x16″ Fluoroscopic Screen and Frame	*Lease*

Kidney Compressor

Made of ribless rubber, with a single seam which will not at any time offer obstruction in the active field. Compressor inflated will conform to any contour perfectly—deflated is 12″ in diameter.

No.	Code
585	*Rubcom*



Intensifying Screens

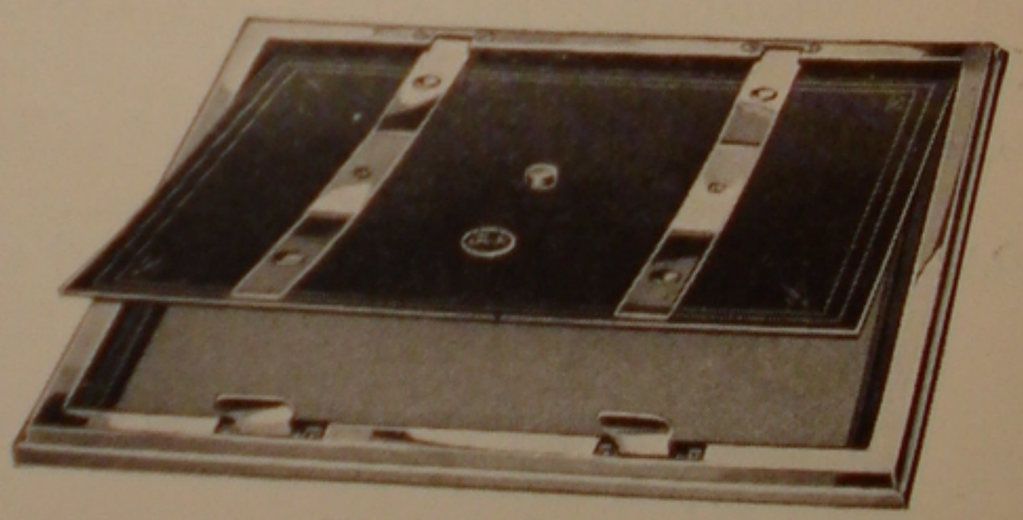
These Screens are fast (time for exposures reduced from 70 to 85 per cent) and will fluoresce brilliantly at the time the X-ray is turned on, but fade out quickly; therefore there is no mottling effect, and the detail is perfect. All Fischer Screens are washable.

Do not use a smaller size plate than the size of the screen, owing to the danger of damaging the sensitive emulsion with the edge of the plate.

No.		Size	Code
1040	Patterson Screen, each	8″x10″	*Diatom*
1041	Patterson Screen, each	10″x12″	*Digest*
1042	Patterson Screen, each	11″x14″	*Dinus*
1043	Patterson Screen, each	14″x17″	*Disk*

Intensifying Screen Holder

An all aluminum Plate Holder or Cassette, which can be used with or without an intensifying screen. Being constructed of metal throughout, all warping is eliminated. Absolutely light-proof. Strong springs hold the screen and plate tightly together, insuring the maximum of efficiency from the screen itself.

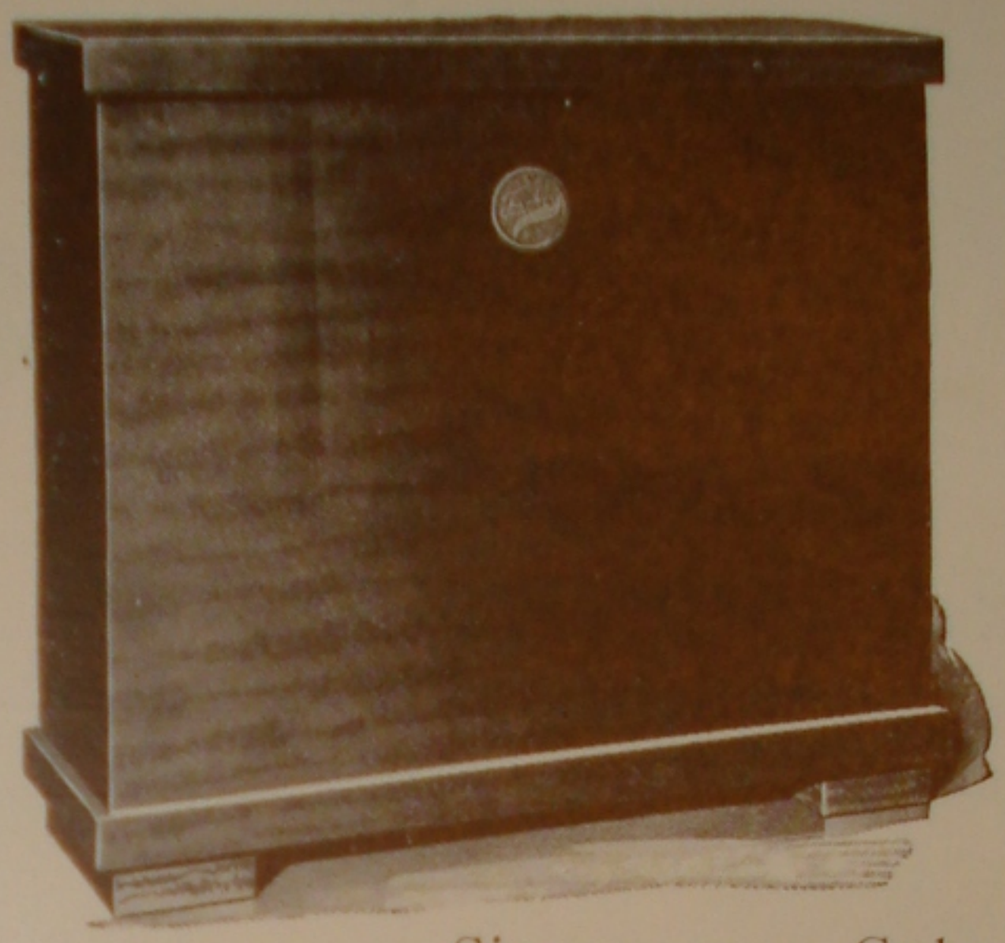


Fischer Cassette

No.		Size	Code
1044	Fischer Aluminum Cassette	8″x10″	*Dermis*
1045	Fischer Aluminum Cassette	10″x12″	*Derrid*
1046	Fischer Aluminum Cassette	11″x14″	*Dew*
1047	Fischer Aluminum Cassette	14″x17″	*Diad*

Lead Lined Plate Boxes

The Fischer Plate Boxes are carefully constructed, and lined with heavy sheet lead. All joints are sealed, and nail and screw holes are soldered over to prevent any possible chance of the X-ray leaking into the contents. The lead on the cover is pressed out to insure a snug fit into the box, and reinforced to protect it fram sagging. These boxes are finished in mahogany. Made up in three sizes:



No.		Size	Code
573	For Dental Films only	4″x 5″	*Dun*
575	For Plates up to and including	8″x10″	*Dens*
577	For Plates up to and including	14″x17″	*Deric*

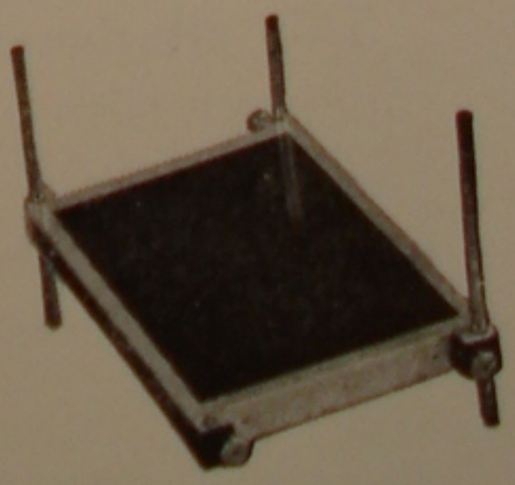
The McKenna Model Tunnel Plate Changers

No.		Code
965	10x12 Changer with adjustable legs	*Riches*
966	11x14 Changer without adjustable legs	*Ricket*
968	Pedestal for either 8x10 or 10x12 size	*Riddle*
969	Semi-circular head clamp for use with either 8x10 or 10x12 size	*Rifraf*

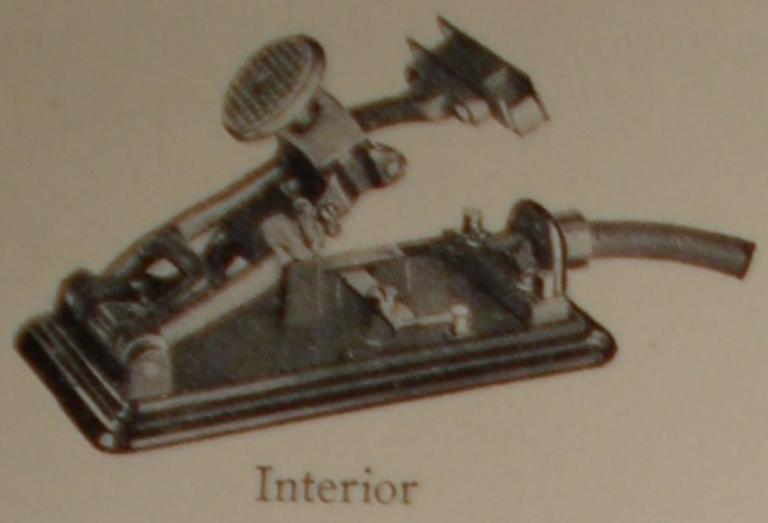




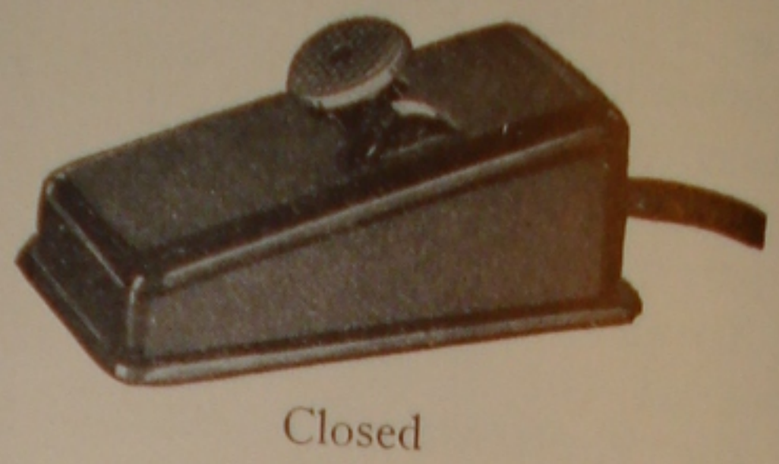




Fischer Foot Switch



Interior



Closed

No.		Code
400	Foot Switch, no cable	*Fant*
401	Foot Switch Cable	*Fall*

Fischer X-Ray Timer



Permitting accurate timing of exposures from one-quarter second to twelve seconds. This switch automatically turns off the current at the end of the exposure, or the exposure may be terminated by simply releasing the pressure from the push button.

Is to be used with equipment with capacity of 10 milliamperes or less.

No.		Code
408	With 8′ Cable	*Fanlie*

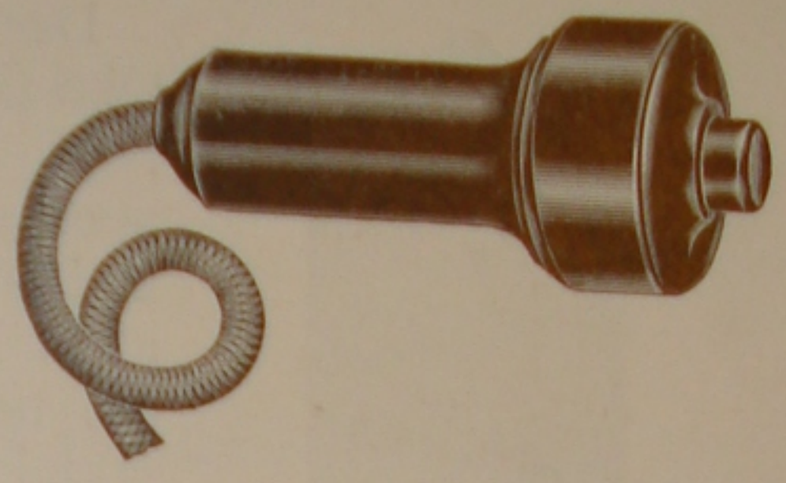
Contactor for X-Ray Timer

This attachment is necessary when using the No. 408 Timer on equipment with over 10 milliampere capacity; as for example, our Types "S" and "2-B" outfits. The primary current is controlled through extra large contacts, and the Timer No. 408 only operates the magnet which in turn opens and closes these contacts.

No.		Code
409	Timer No. 408 and Contactor No. 407	*Fancon*

Hand Control Switch

Push button type, encased in hard rubber. Furnished with six feet connecting cable.



No.		Code
404	Hand Control Switch	*Fantyr*

Flexible Rubber Protection Gloves

No.		Code
361	Protection Gloves with gauntlets for wrist protection	*Alsol*

Leaded Glass Spectacles

No.		Code
358	Lead Glass Spectacles	*Alight*

Sheet Lead

Sheet Lead, $\frac{1}{16}$" thick for mounting on walls and doors of X-ray rooms, for the protection of X-ray plates, etc.

No.		Code
381	Sheet Lead—in widths up to 24 inches	*Glomus*

Lead Glass

Lead Glass, for use as protection in cabinets and for shields. Extra heavy thickness, containing about 50% lead.

No.		Size	Code
			Glona
390	Lead Glass, square inch		*Gloss*
391	Lead Glass	5″x 7″	*Glusit*
392	Lead Glass	6″x 8″	*Glutin*
393	Lead Glass	7″x 9″	*Glycin*
394	Lead Glass	8″x10″	*Goad*
395	Lead Glass	10″x12″	*Goblet*
396	Lead Glass	11″x14″	

Lead Protection Screen

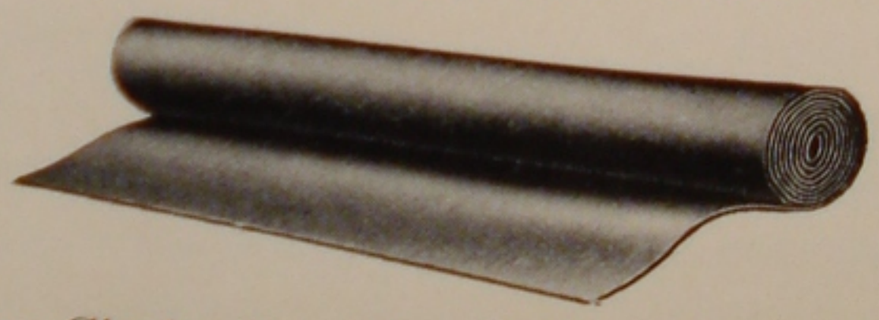


Designed and built for the X-ray operator who desires the maximum protection from the rays. Made of $\frac{1}{16}$" sheet lead, covered all over with wooden panels. Size over all, 27 inches by 7 feet. Has a 6"x8" imported lead glass window, to enable the operator to see the tube in action without exposing himself. Handsome in appearance; durable in construction. Mounted on large, free-rolling casters, it is easily moved about.

No.		Code
349	Fischer protection Screen, Oak Finish	*Amice*
350	Fischer Protection Screen, Mahogany Finish	*Alum*
351	Fischer Protection Screen, Solid Mahogany	*Amara*

Other finishes on request.

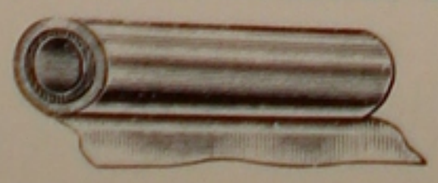
X-Ray Protection Cloth



X-ray Protection Cloth, in strips 36" wide, any length, made of heavy lead impregnated rubber with a linen center insuring great strength as well as absolute protection.

No.		Code
383	Cloth, lb.	*Ameba*

Lead Protection Foil



For protecting parts adjacent to those being treated by the X-ray. Rolls are 6" wide, and .006" thick.

No.		Code
380	Foil, pound (in 2½-lb. rolls)	*Globe*

For Prices see List Attached

X-Ray Protective Aprons

X-ray Protective Aprons, made of the same material as No. 383.

No.		Code
385		*Amot*

Lead Letters and Figures

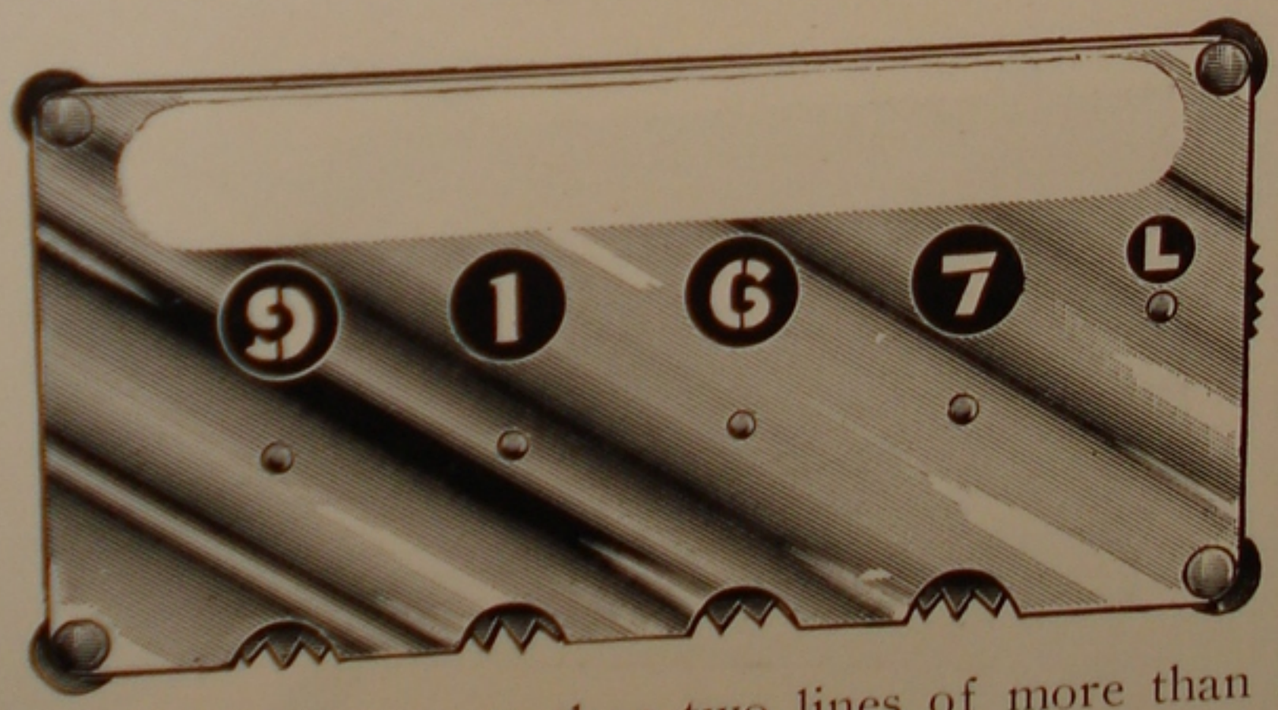
HAIR LINE

ÊÊÊÊÊÊ

May be obtained in sets of from 1 to 0, or complete alphabet, or any desired combination of the two.

No.		Code
563	Lead Letters	*Forged*
564	Lead Numbers	*Forbid*

Plate Marker



Any name not having more than two lines of more than 20 letters, may be cut in the top section. The four wheels may be manipulated to show any number up to 9999. A fifth wheel is provided with letters "R" and "L" so that the right and left may be plainly marked.

No.		Code
570	Plate Marker	*Fames*

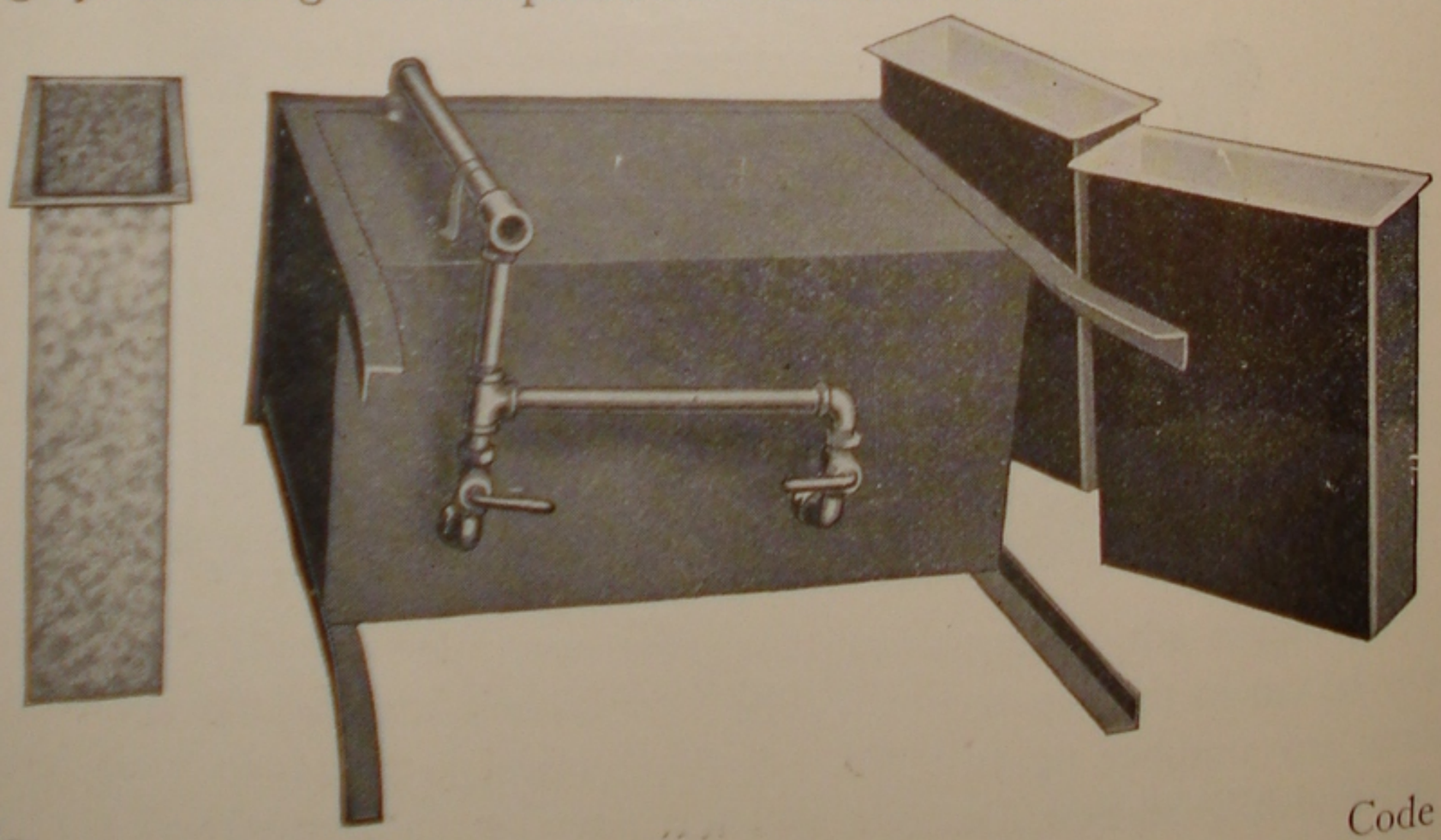
For Prices see List Attached

Army Tank Developing System
(Magnuson Type)



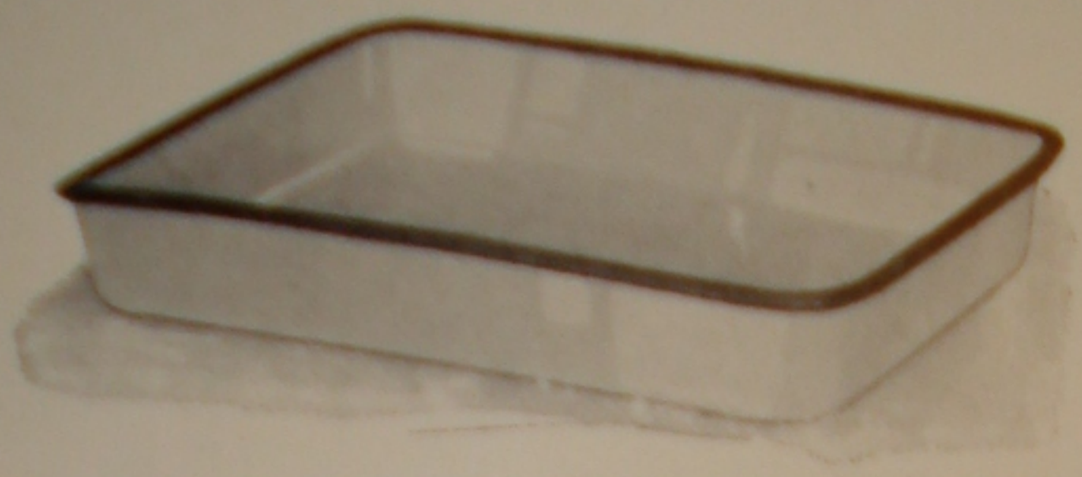
Each compartment is equipped with twin drain, so that but one connection to main drain is necessary. The washing compartment has an overflow and intake pipe, so arranged as to keep a constant uniform motion of the water.

The wall dividing the main tank is provided with air space, thoroughly insulating one compartment from the other.



No.		Code
1925	Army Tank System Complete, consisting of galvanized housing, 2 steel enamel tanks 4½-in. wide and 1 galvanized cooling tank 5-in. wide	*Unfit* *Ungot*
1926	Cooling Tank for above system	

Steel Enameled Developing Trays



No.		Code
1604	For 5″x 7″ plates	*Adeps*
1605	For 8″x10″ plates	*Adler*
1606	For 10″x12″ plates	*Agaric*
1607	For 11″x14″ plates	*Agave*
1608	For 14″x17″ plates	*Agnea*

Porcelain Enameled Tanks



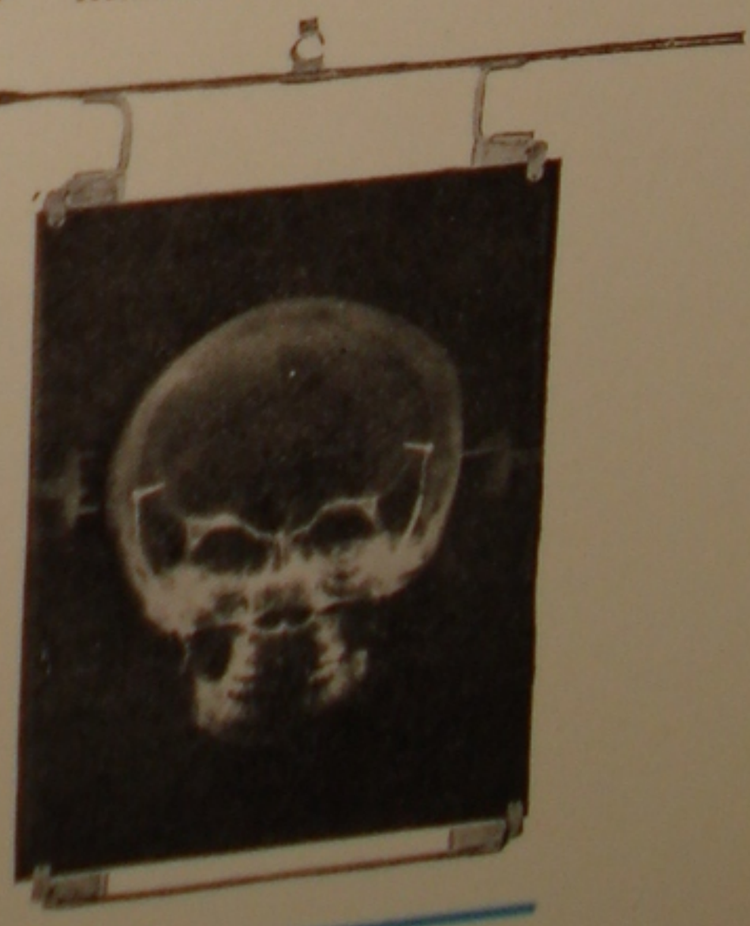
Blue enameled outside, and white inside, with turned-over rim at the top.

The smaller sizes listed below are widely used in dental laboratories; larger sizes used alone, or in combination with galvanized tanks.

No.		Code
1698	Tank for 8x10 plates—size 2″x9″x14″	*Image*
1700	Tank for 14x17 plates—size 2″x15″x20″	*Impose*
1701	Tank for 14x17 plates—size 5″x15″x20″	*Impugn*

Film Developing Frames

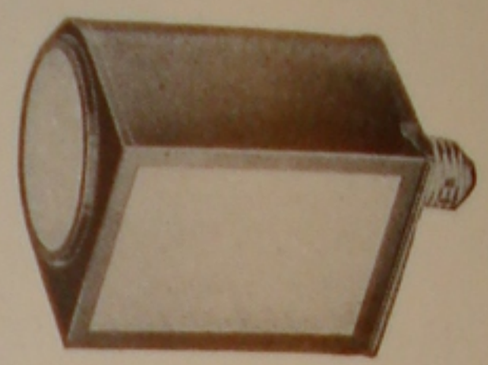
No.		Code
1715	For 5 ″x 7 ″ Films	*Incur*
1716	For 6½″x 8½″ Films	*Indeed*
1717	For 8 ″x10 ″ Films	*Indent*
1718	For 10 ″x12 ″ Films	*Index*
1719	For 11 ″x14 ″ Films	*India*
1714	For 14 ″x17 ″ Films	*Indict*



Kodak Safelight Lamp



No. 1602



No. 1601

The Kodak Safelight Lamp is ideal for all dark-room uses. Unless otherwise specified, the lamp is supplied with a 5″x7″, Series 2, red safelight. Safelights of other series may be obtained if specified.

Supplied complete, excepting electric bulb, including besides the safelight, four feet of electric light cord with socket.

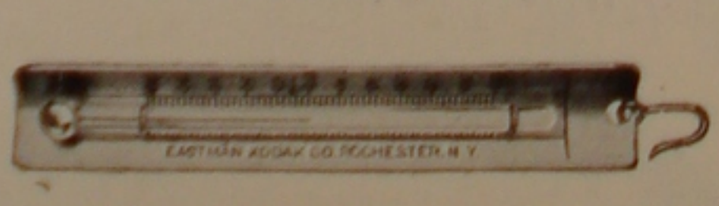
No.	Code
1602	*Bathko*

The Safelight Dark Room Ruby Lamp

Slightly larger than the electric bulb it holds, the Safelight Lamp screws into an electric socket which may be conveniently situated close to the place where the work is to be done.

No.	Code
1601	*Bath*

Thermometer



Serves a double purpose; handy as a stirring device, and automatically indicates the temperature of the solutions. Equally valuable in tank or tray development.

No.	Code
202	*Herd*

For Prices see List Attached

Fischer Interval Timer



This timer may be set for every interval from a quarter of a minute up to two hours. Does not start until the alarm is wound and stops with the ringing of the alarm.

No.		Code
466		*Hyper*

Glass Graduates

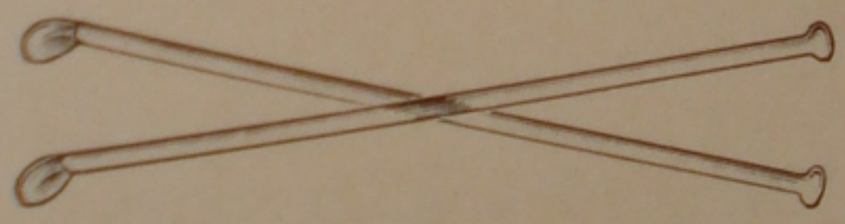
No.		Code
581	8 oz. size	*Alalin*
582	16 oz. size	*Alder*

Funnels

Fluted Funnels made of strong, heavy glass.

No.		Code
595	8 oz. size	*Agria*
596	16 oz. size	*Ague*

Plain Glass Stirring Rods



Made of plain clear glass rod, flattened slightly at the end. Makes a good mixing rod for developer and hypo. Come in pairs, one for Hypo and one for Developer.

No.		Code
201	Pair	*Advene*

Barium Sulphate

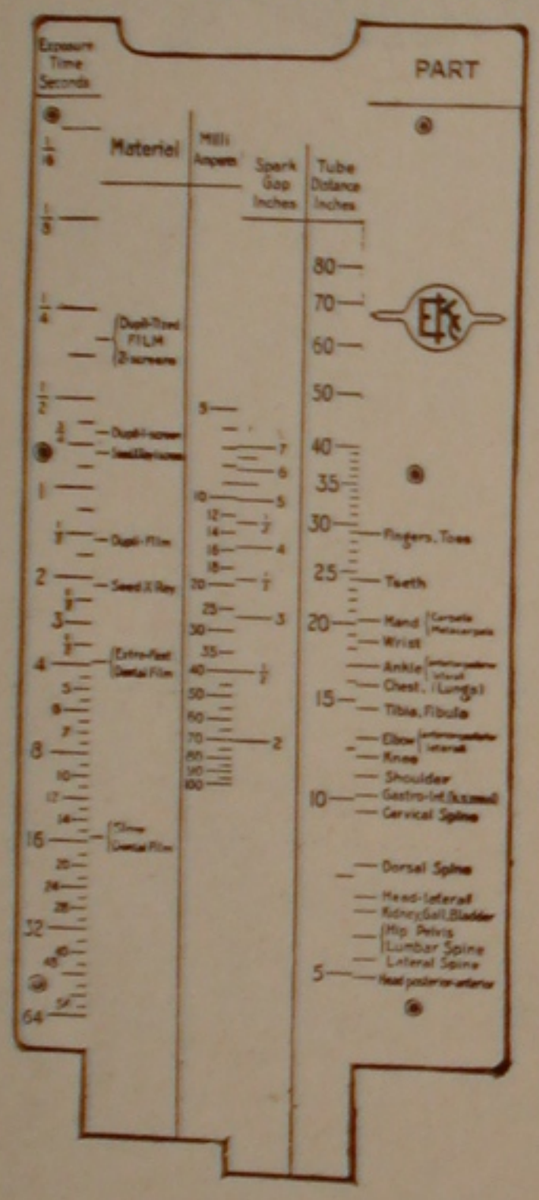
For use in Roentgen examinations of the alimentary tract.

No.		Code
1626	Package of 1 lb., with full instructions printed on label	*Barsul*

Dental Glass Developing Tanks

Made of clear glass with two compartments, they are ideal for developing dental films. To be used in pairs, placing the developer in the small compartment and cold or ice water in the large compartment of the first tank, and, in extreme hot weather, chrome alum solution for hardening the gelatin on the films in the small compartment of the second tank.

No.		Code
1697	Glass Developing Tank	*Impel*



The Eastman X-Ray Exposure Rule

Positively determines the exact time of exposure of any part of the body at any tube distance, spark gap, milliamperes and type of material used. An accurate slide type rule that has been fully tested and approved.

No.		Code
1733	Eastman Exposure Rule	*Easex*

Manila Filing Envelopes

Made of heavy Manila paper, to be used for filing finished negatives. Have record blanks on side same as the orange X-ray Envelope.

No.	Size	Code
1650	5″ x 7″	*Fovea*
1651	6½″ x 8½″	*Frax*
1652	8″ x10″	*Fret*
1653	10″ x12″	*Frost*
1654	11″ x14″	*Focus*
1655	14″ x17″	*Funda*

Eastman Duplitized X-Ray Films

No.	Size		Code
1685	5″ x 7″	—Super-Speed	Code
1686	6½″x 8½″	—Super-Speed	*Cholin*
1687	8″ x10″	—Super-Speed	*Cronic*
1688	10″ x12″	—Super-Speed	*Chyle*
1689	11″ x14″	—Super-Speed	*Cina*
1690	14″ x17″	—Super-Speed	*Circle*
			Claret

X-Ray Exposure Holders

The hinged cardboard with the orange envelope, securely fastened by metal clips, permits the film to be handled with greater convenience during exposure.

No.	Size		Code
1678	5″ x 7″		*Ladle*
1679	6½″x 8½″		*Lagoon*
1680	8″ x10″		*Ladder*
1681	10″ x12″		*Laguna*
1682	11″ x14″		*Label*
1683	14″ x17″		*Labial*

X-Ograph Developer

This Developer is carefully compounded from strictly high-grade chemicals, and will produce clear brilliant results—giving the snap and sparkle so necessary in rendering exquisite detail in bone or tissue structure.



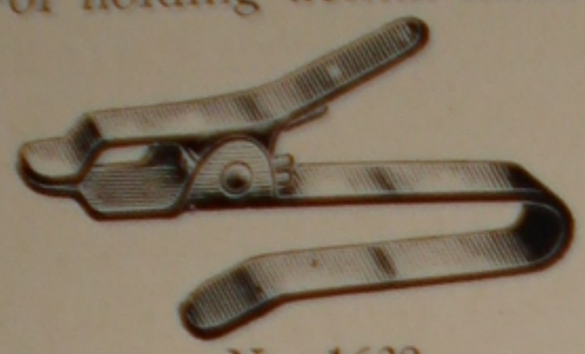
No.		Code
680	⅛ Gallon Size—contains sufficient powder to make sixteen ounces of ready-to-use Developing Solution	*Laira*
681	1 Gallon Size—contains sufficient powder to make one gallon of ready-to-use Developing Solution	*Lamboy*

X-Ograph Fixing and Hardening Bath

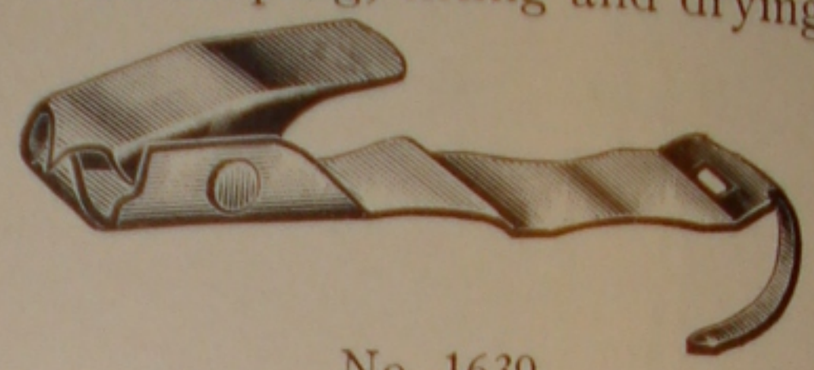
No.		Code
683	1-Pound Package — contains sufficient powder to make sixty-four ounces of Double Strength Fixing Solution	*Braxy*

Dental Film Clips

For holding dental films securely while developing, fixing and drying.



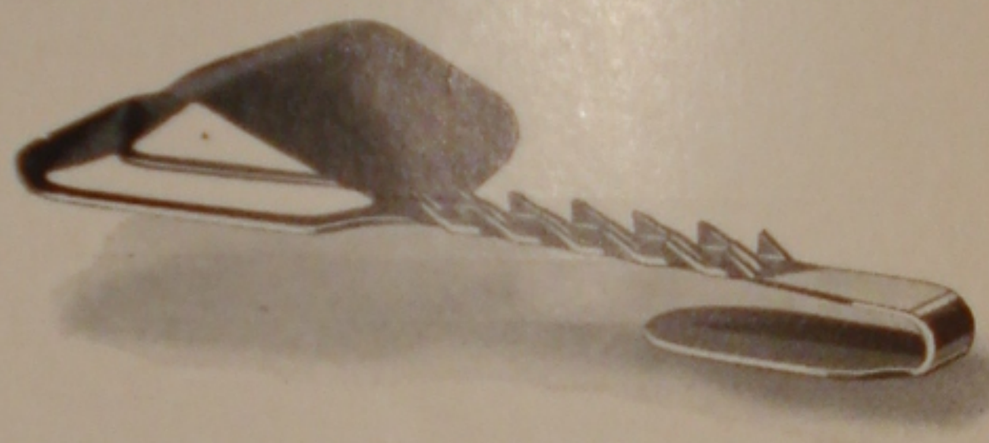
No. 1638



No. 1639

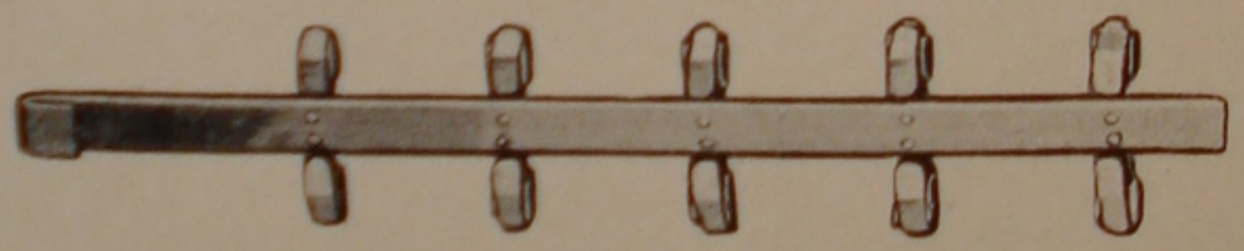
No.		Code
1638	Film Clips—Metal	*Caul*
1639	Film Clips—Metal	*Daft*

Fischer Film Holder



No.		Code
1646		*Casein*

Dental Film Holder

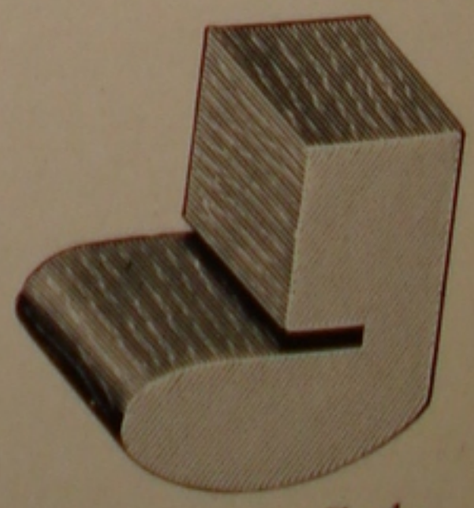


No.		Code
1647	Metal Dental Film Holder, for 10 films. Nickel-plated	*Cactus*
1675	Eastman Film Holders for 14 dental films	*Vestal*

The "SP" Wooden Film Retainer

This Wood Block Film Holder is used to support the radiographic film in the mouth, especially where it is difficult for the patient to hold the film in proper position or when patient is distressed with the film.

Can be used either for uppers or lowers. Easily sterilized.



No.		Code
1632	"SP" Wooden Film Holder, box of 10 blocks	*Shapa*

The X-Ograph Film Packets





No.		Code
1644	Small Size Films (Slow brand emulsion), package of 1 dozen packets	*Brow*
1645	Small Size Films ("Speed" Fast brand emulsion), package of 1 dozen packets	*Hazed*
1648	Regular Size 1¼"x1⅝" Films (Slow brand emulsion), package of 2 dozen packets	*Bulla*
1649	Regular Size, 1¼"x1⅝" ("Speed" Fast brand emulsion), package of 2 dozen packets	*Speed*

Eastman Dental X-Ray Films

No.	Size	Code
1640	1¼"x1⅝", "Extra Fast"	*Brain*
1665	1¼"x1⅝", "Slow Type"	*Bot*
1666	2¼"x1⅝", "Slow Type"	*Botany*
1667	2¼"x3 ", "Slow Type"	*Bougie*

Dental X-Ray Film Mounts

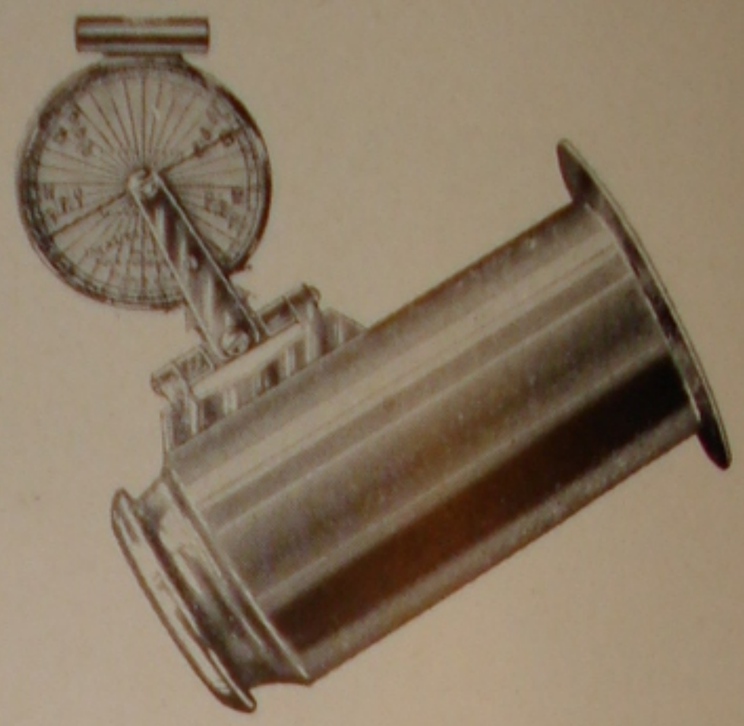
We stock the best Dental Radiograph Film Mounts that are manufactured today, but the list of various types and prices is entirely too lengthy for this publication. We suggest to those who are interested that they *send for our*

Special Radiograph Mount Catalog

with samples, which we will gladly send on request.

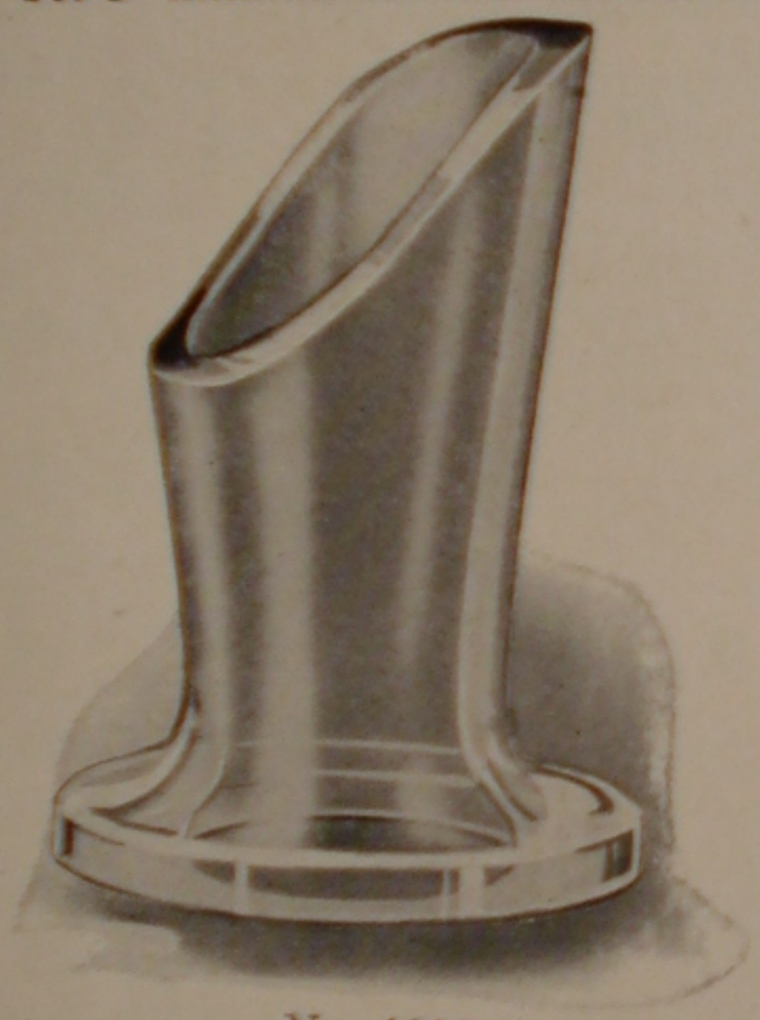
For Prices see List Attached

Raper Angle Meter



The Angle Meter is an instrument to be attached to the cone of your X-ray tube. It points out the correct angle at which the teeth should be rayed and indicates when the proper adjustments have been made. During three years of practical use the Angle Meter has proven itself 95% efficient.

No.		Code
1078		*Rapang*



No. 1011

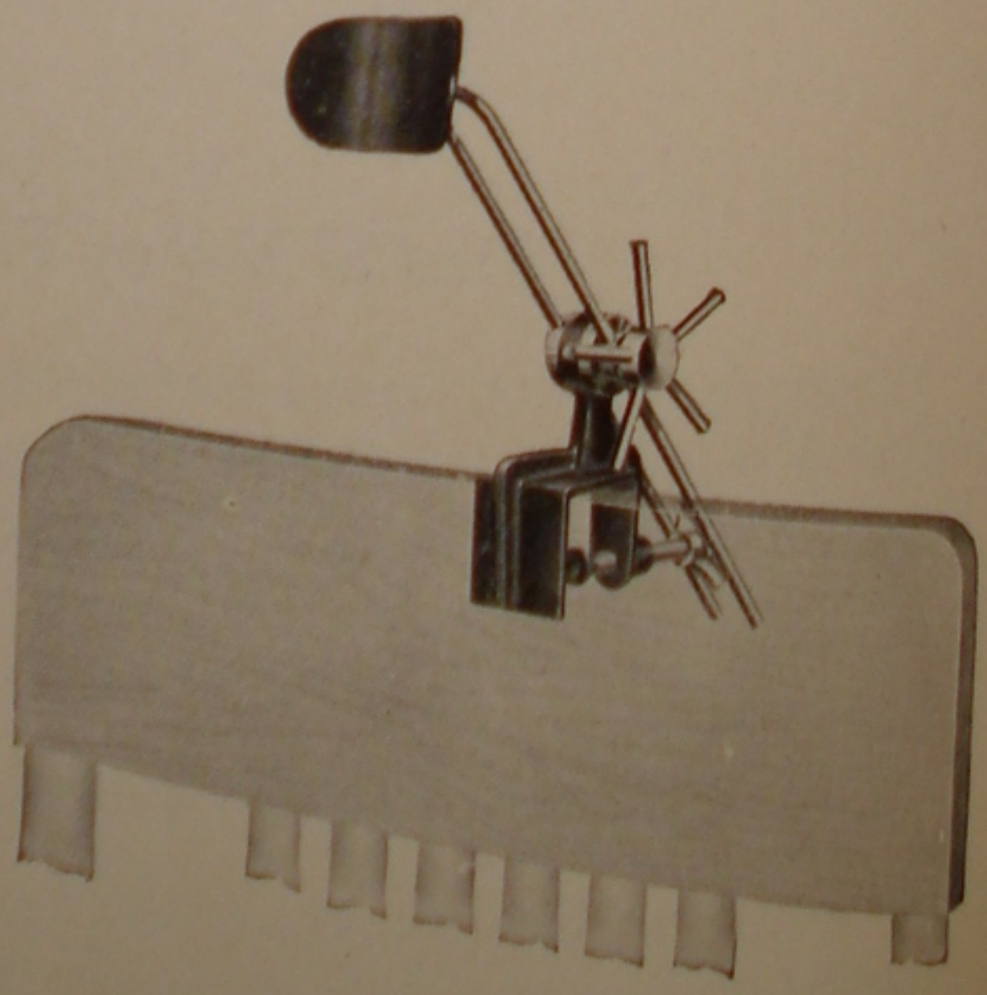
Lead Glass Dental Cone

No.		Code
1010	Lead Glass Cone (short)	*Carus*
1011	Lead Glass Cone (long)	*Carlog*

Fischer Adjustable Head Rest With Chair Clamp

Especially useful for the dentist as an aid in supporting the head of the patient while making dental radiographs. Can be attached to any chair. Made of all metal, part nickel-plated, and part enameled.

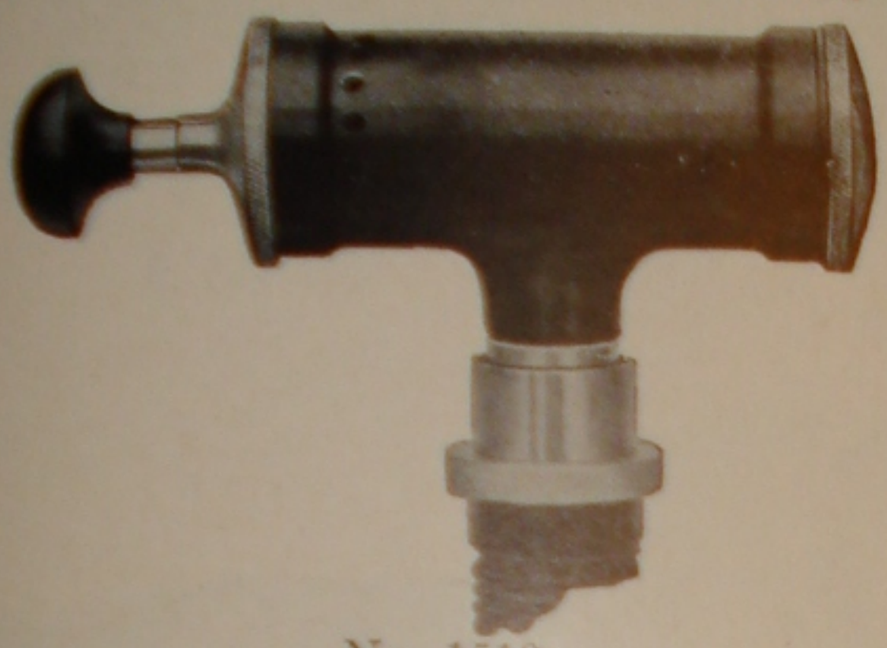
No.		Code
1012	Fischer Head Rest	*Calsis*



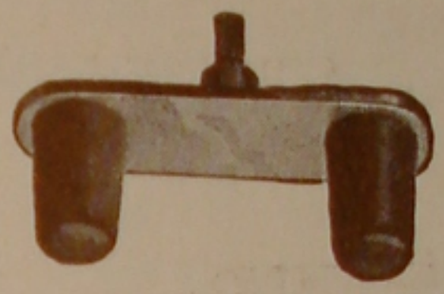
No. 1012

Pneumatic Air Hammer Vibrator

Finished in black enamel and nickel-plate. Arranged to screw on end of pressure handle, or if desired will be furnished complete with a hard rubber handle and pressure hose to attach to any source of compressed air. Degree of vibration controlled by air valve in handle.



No. 1510



No. 1512



No. 1511



No. 1513



No. 1514

No.		Code
1510	Air Hammer Vibrator	*Canker*
1511	Ball Applicator for No. 1510	*Canon*
1512	Spine Applicator for No. 1510	*Canula*
1513	Curved Applicator for No. 1510	*Captul*
1514	Large Body Applicator for No. 1510	*Caput*

Dr. Pope's Dilators



No.		Code
1340	No. 1 size Dilator	*Popone*
1341	No. 2 size Dilator	*Poptwo*
1342	No. 3 size Dilator	*Poptre*
1343	No. 4 size Dilator	*Popfor*
1344	No. 5 size Dilator	*Popfiv*
1345	Set of five Dilators	*Popset*

Cavity Vibratodes



No. 1560



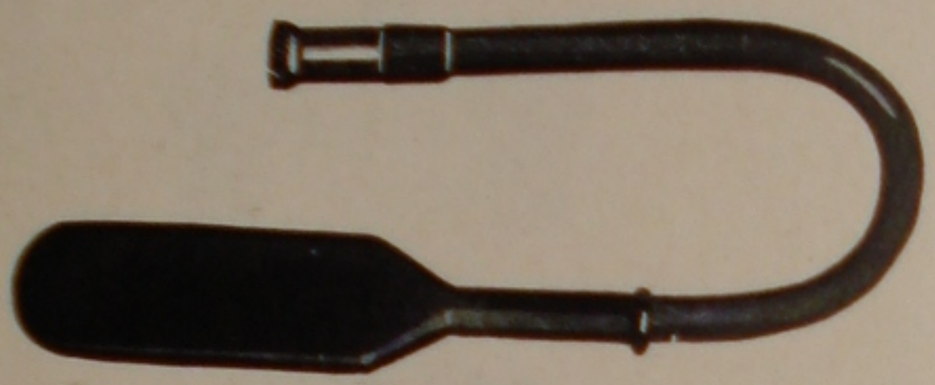
No. 1560A



No. 1561



No. 1561A



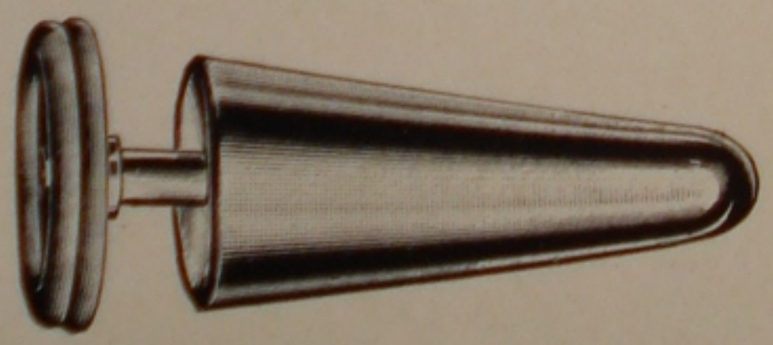
No. 1562



No. 1562A

No.		Code
1560	Vaginal Vibratode, Hard Rubber	*Kane*
1560A	Vaginal Vibratode, Soft Rubber Cap	*Kaolin*
1561	Rectal Vibratode, Hard Rubber	*Karma*
1561A	Rectal Vibratode, Soft Rubber Cap	*Karoo*
1562	Flexible Rubber Colon Catheter	*Kauri*
1562A	Dilating Bag for No. 1652 Catheter	*Keany*

Pennington Rectal Cone



The Pennington Rectal Cone adapted for use with the No. 1551 Vibratode as furnished with all Fischer-Thompson-Plaster Electrical Cabinets.

No.		Code
1590	Including Metal Holder	*Penco*

For Prices see List Attached

Pneumatic Rubber Vibratodes



No. 1550



No. 1550R



No. 1551R



No. 1551



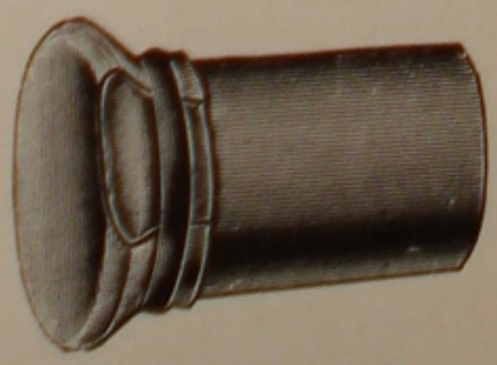
No. 1552



No. 1552R

No.		Code
1550	Small Size Vibratode, Rubber Holder	*Kation*
1550R	Small Size Vibratode, Rubber Cap	*Kabul*
1551	Medium Size Vibratode, Metal Holder	*Kadesh*
1551R	Medium Size Vibratode, Rubber Cap	*Kaffir*
1552	Large Size Vibratode, Metal Holder	*Kago*
1552R	Large Size Vibratode, Rubber Cap	*Karek*

Special Ear Vibratode



An ingenious device for the application of vibration and variable sound tones simultaneously. Must be tried to be appreciated.

No.		Code
1567		*Souvib*

For Prices see List Attached

Sinus Suction Tube

So constructed that it is impossible for the aspirated matter to enter the second bulb or tubing. Furnished with 4 ft. rubber tubing and a metal attachment to fit the Vacuum Handle supplied with our Cabinet Apparatus.

No.	Code
1503	*Jesitu*

Pressure Handle



No. 1516

Hard Rubber Handle, fitted with control valve, for use with Vibrator No. 1510 if you have no T. & P. Cabinet.

No.		Code
1516	Pressure Handle with 6′ Tubing	*Cyprus*

Pressure Tubing

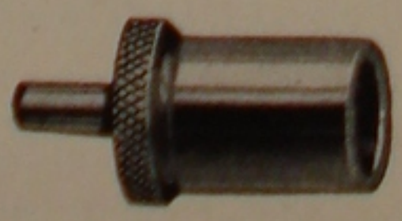
Extra Pressure and Vacuum Tubing, cotton covered any lengths.

No.	Code
1517	*Cyanic*



No. 1517

De Vilbiss-Fischer Connector



Arranged to fit the tapered end of the pressure handle furnished with Fischer Cabinets, and to accommodate the regular De Vilbiss bottles.

No.		Code
1530	Metal Connector	*Karyon*

De Vilbiss Atomers



No. 1520



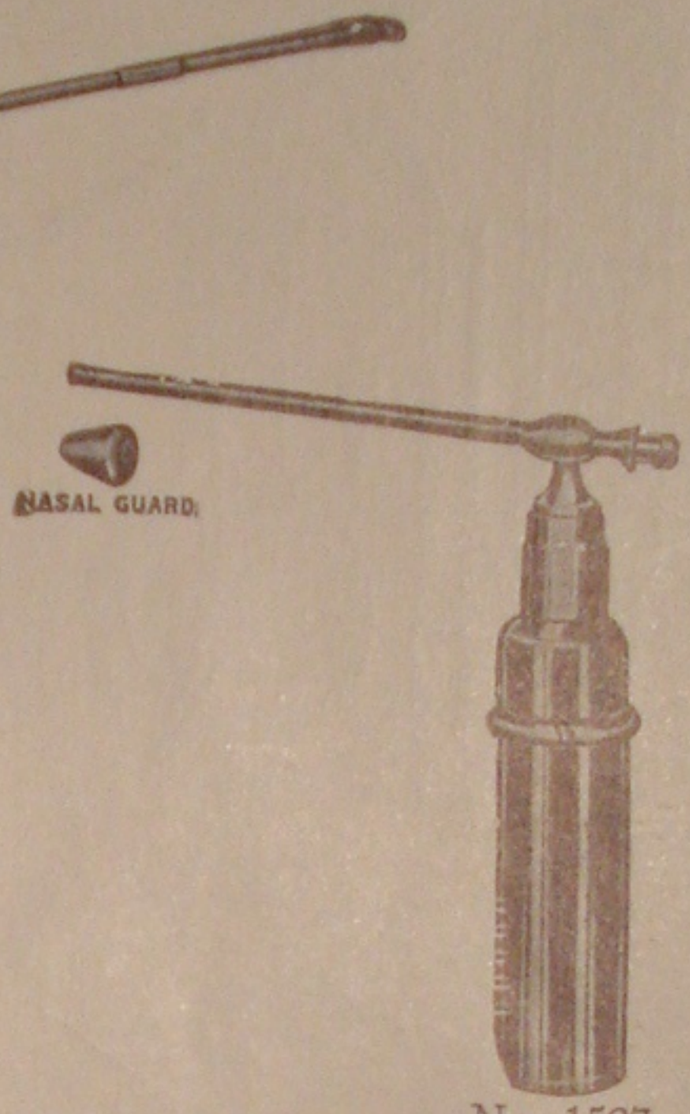
No. 1523



No. 1522



No. 1521



No. 1527

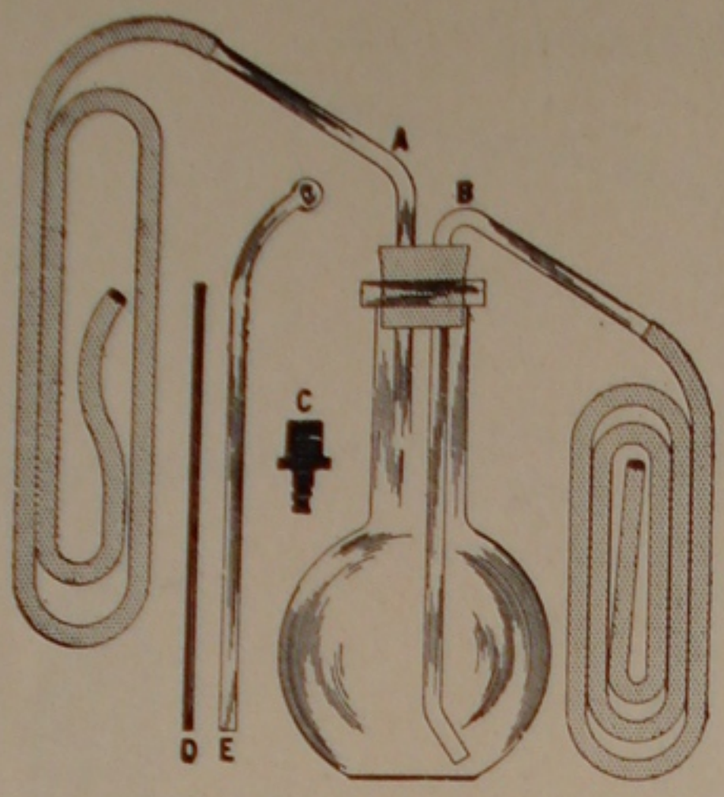
No.		Code
1520	Empty bottle only, with stopper	*Kali*
1521	Atomer. Sprays any liquid, oil or aqueous, in any direction desired	*Kalium*
1522	Nebulizer. Produces a vapor; for oils only. The vapor can be weakened by turning the little table to a horizontal position, or strengthened by turning it to a perpendicular position	*Kamala*
1523	Powder Blower. Diffuses powder perfectly in any direction	*Kalot*
1527	Atomer. For spraying oils and aqueous solutions. It can be easily cleaned by unscrewing the heel-piece and wiping the tube	*Kilter*

Numbers 1521, 1524, 1525 and 1527 are provided with an extra hard rubber tube for spraying corrosive solutions.

Eustachian Tube Opener

No.		Code
1575	Metal Eustachian Tube Opener	*Kennel*

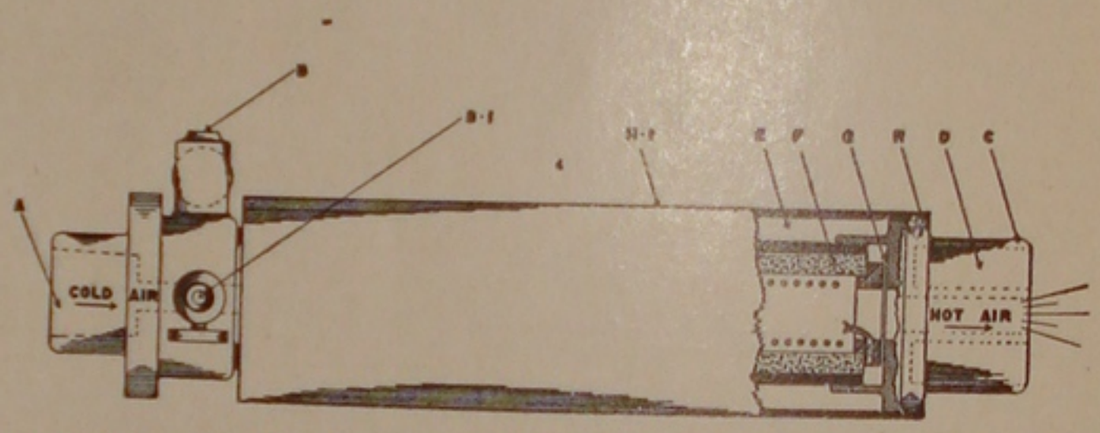




Suction Bottle

No.		Code
1577	Suction Bottle, complete as illustrated	*Hepar*
1532	Extra Bottle only	*Hatch*
1533	Rubber Hose, foot	*Hauld*
1534	Silver Catheter	*Haven*
1535	Glass Syphon	*Hawse*

Air Heater

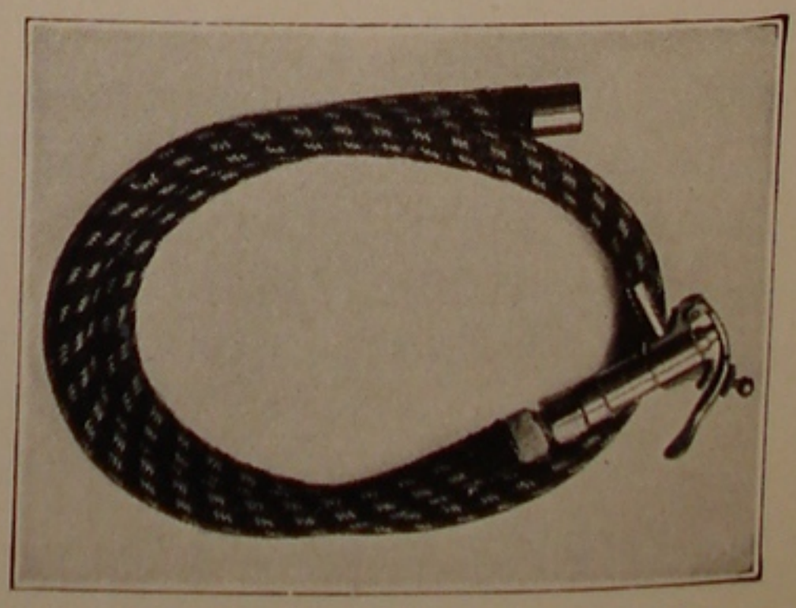


Output is under perfect control as the energy is obtained from the Cautery circuit, and any degree of heat may be maintained indefinitely.

No.		Code
1570	Fischer Air Heater, with extra unit	*Acoin*
1571	Fischer Air Heater Unit	*Keck*
1572	Air Spreader Attachment	*Keel*

Special Cut-off

Unless otherwise advised, the Cut-off will be furnished with a short length of rubber tubing special metal attachment to fit over the end of our Pressure Handle, as indicated on illustration. Also furnished without special "Y" Valve Attachment for side of cabinet, as indicated on page 93 under No. 1110.



No.		Code
1528-531	Special Cut-off	*Kirtle*

Pressure Valve Attachment for Fischer Combination Cabinets

No.		Code
1110-531	Special "Y" Valve with DeVilbiss No. 1528-531 Cut-off with 6′ hose	
1111	Pressure Valve only	*Ictus*
1517	Extra Pressure Hose, foot	*Igloo*

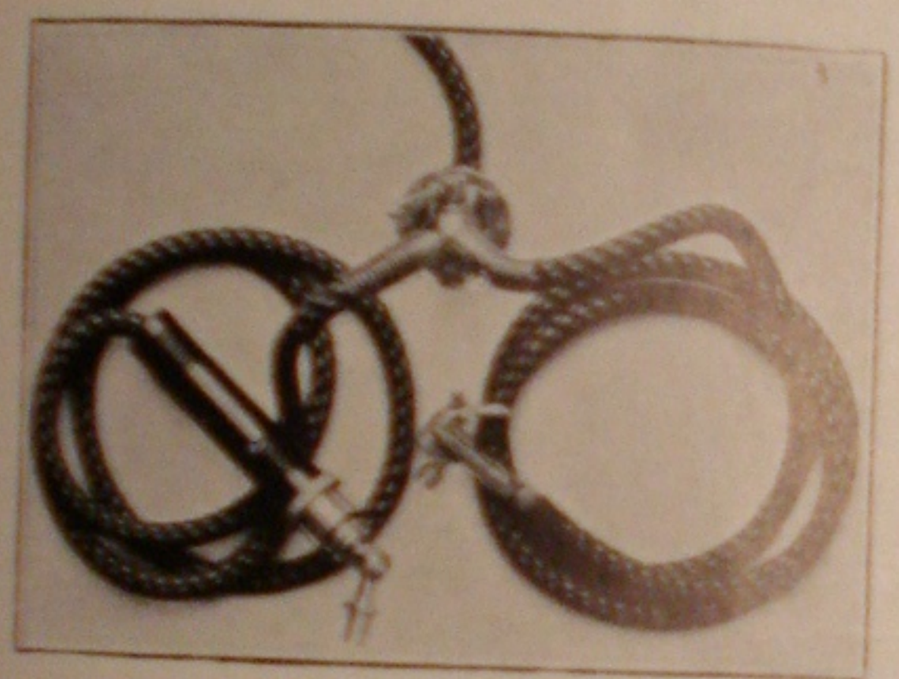


Illustration No. 1

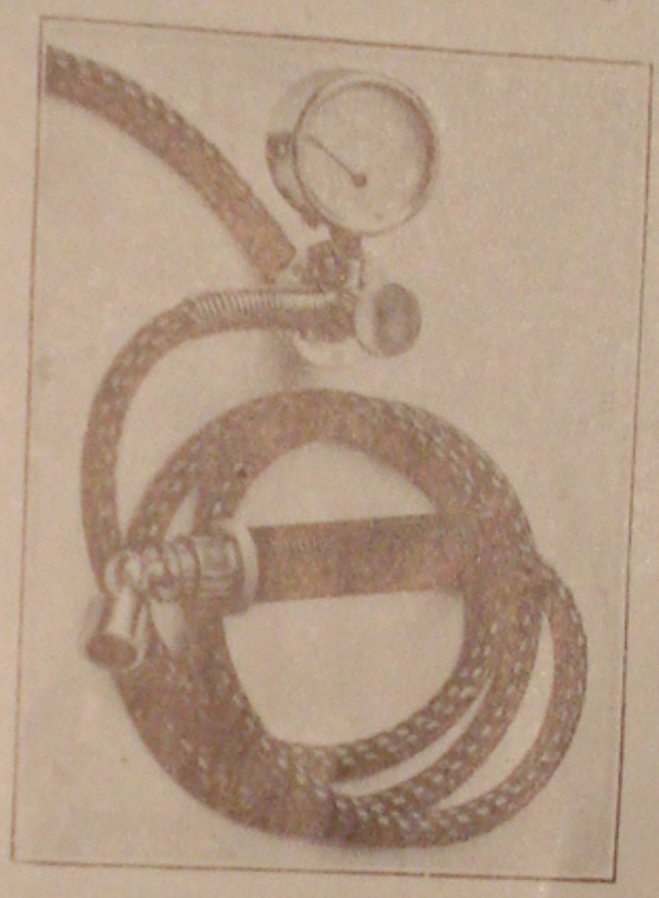


Illustration No. 2

Vacuum Valve Arrangement

The Vacuum Handle and 6-foot tube, illustrated under No. 2 is not included with the regular No. 1113, as these parts are already furnished with each of our cabinets.

The regular Pressure Handle and 6-foot hose as shown in illustration No. 1, above, is not included with the regular No. 1110 Valve order, as these parts are already furnished with each of our cabinets.

No.		Code
1113	Vacuum Gauge and Regulating Valve with 30-inch hose	*Ides*
1114	Vacuum Gauge only	*Idle*
1517	Vacuum Hose, foot	*Cyanic*



Exhaust Filter

For mounting between the cup holder and the vacuum handle proper. Stuffed with absorbent cotton, it prevents the passage of the extracted fluid to the pump.

No.		Code
1504	Exhaust Filter	*Icfilt*

Glass Exhaust Cups

Made of smoothly finished, plain glass, with rim of heavier glass on the edges. The ends are fitted to the rubber bushing in the vacuum handle on all Fischer cabinets containing pump features.



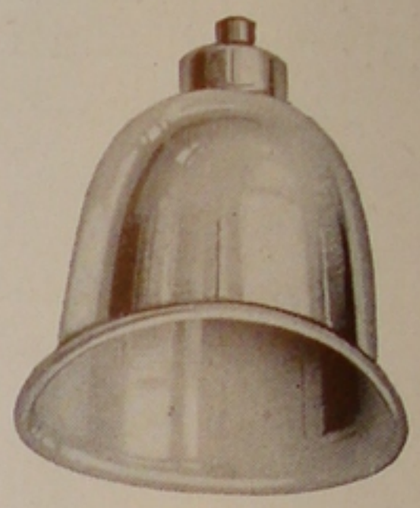
No. 1500A



No. 1500B



No. 1500C



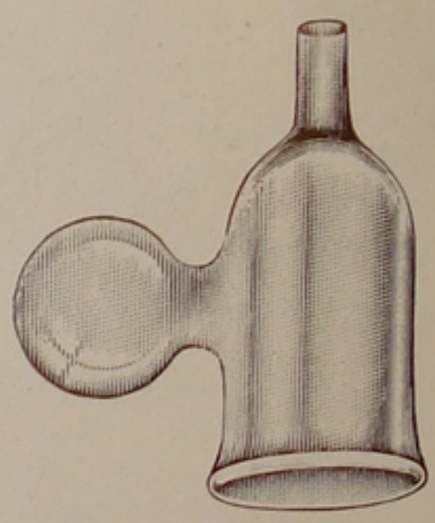
No. 1505



No. 1507



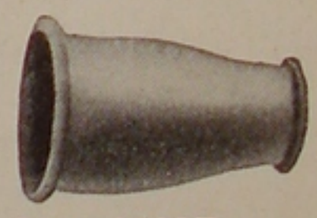
No. 1508



No. 1501



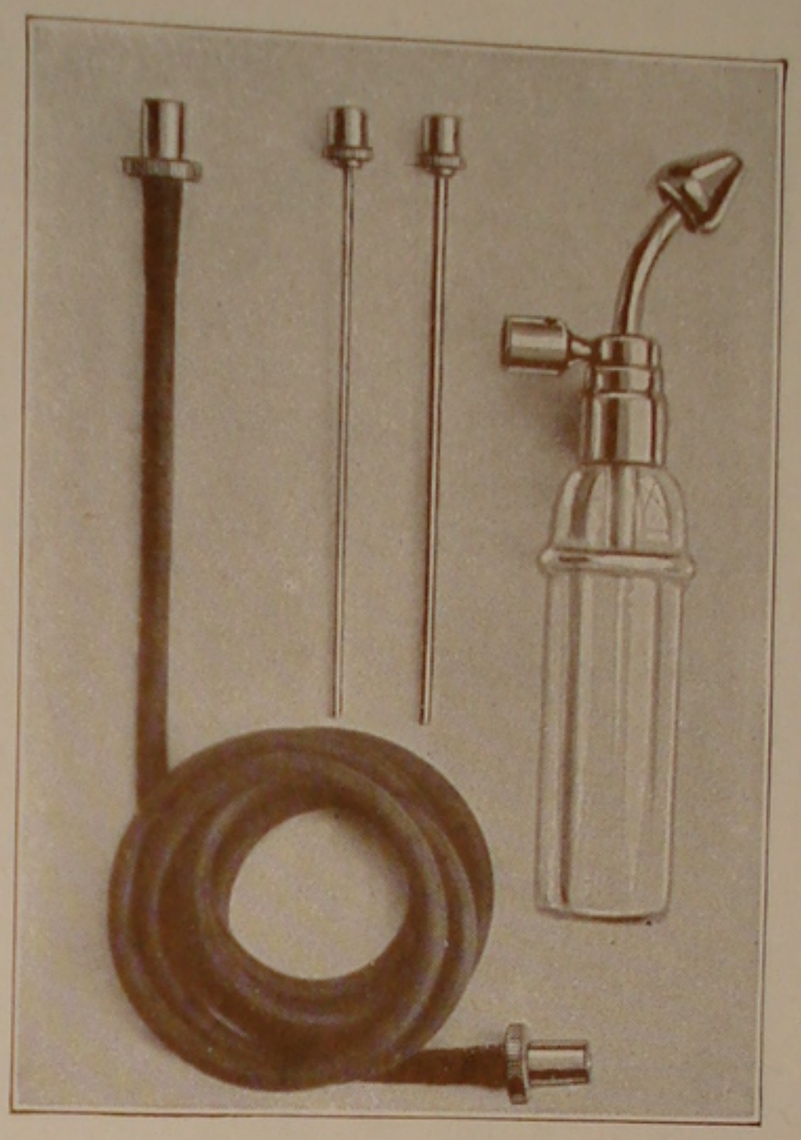
No. 1507R



No. 1508R

No.		Code
1500A	Vacuum Cup, 1″ Diameter	*Jeloy*
1500B	Vacuum Cup, 1½″ Diameter	*Jervin*
1500C	Vacuum Cup, 2″ Diameter	*Jesuit*
1501	Exhaust Cup with trap	*Jesty*
1505	Glass Breast Cup	*Jigger*
1507	Glass Panaris Cup	*Joint*
1507R	Soft Rubber Panaris Casing	*Jolly*
1508	Glass G. U. Tube	*Joule*
1508R	Soft Rubber G. U. Casing	*Jugal*

The Fischer-DeVilbiss Sinus Suction Bottle



Consisting of bottle, nose piece, 2 silver catheters, rubber tube and connectors.

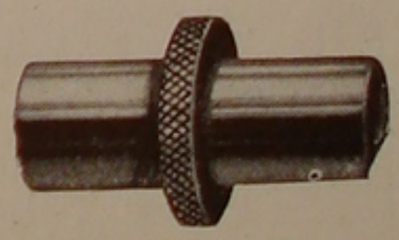
No.		Code
1790		*Umbra*
1791	Bottle and Nose Piece	*Unarm*
1792	Small Silver Catheter	*Unbar*
1793	Large Silver Catheter	*Uncle*
1794	Hose and Connectors	*Undue*

Rubber Vacuum Cups





No. 1555



No. 1573

No.		Code
1555	Flexible Rubber Vacuum Cup	*Kale*
1556	Flexible Rubber Cup (large)	*Kandy*
1573	Metal Attachment for connecting the rubber cups to the vacuum handle	*Kelpie*

Motor and Pump Grease

No.		Code
1582	Small can	*Ketch*
1589	½ lb. can	*Keease*

Books on Physiotherapeutic Subjects

On Diathermy

No.		Code
1737	"Diathermy—Its Production and Uses in Medicine and Surgery" by Elkin P. Cumberbatch, M. D.	*Incumb*
1742	"Diathermy and its Application to Pneumonia" by Harry Eaton Stewart, M. D.	*Instew*
1746	"Practical Electrotherapeutics and Diathermy" by G. Betton Massey, M. D.	*Verbal*
1747	"Practical Index to Electrophysiotherapy" by J. E. G. Waddington, M. D.	*Verbos*
1749	"Physiotherapy Technic" by C. M. Sampson, M. D.	*Insamp*
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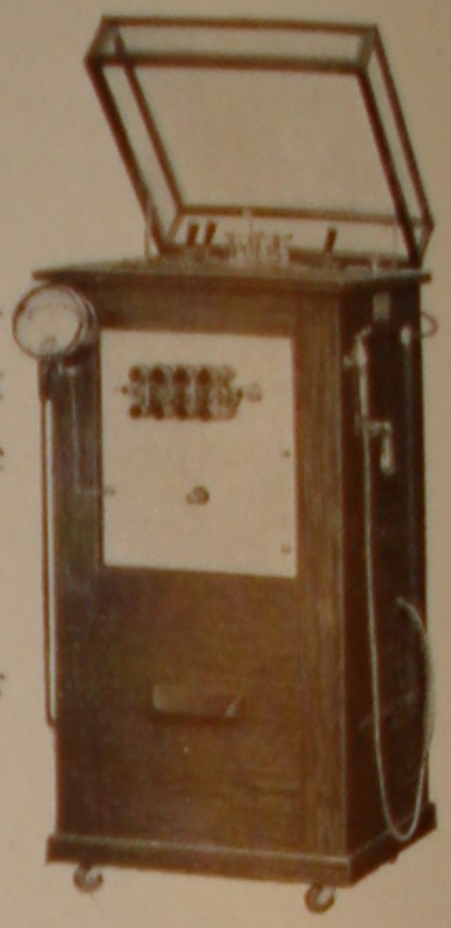
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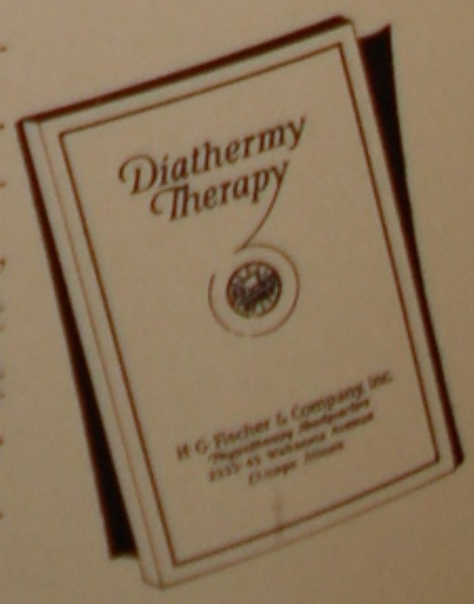
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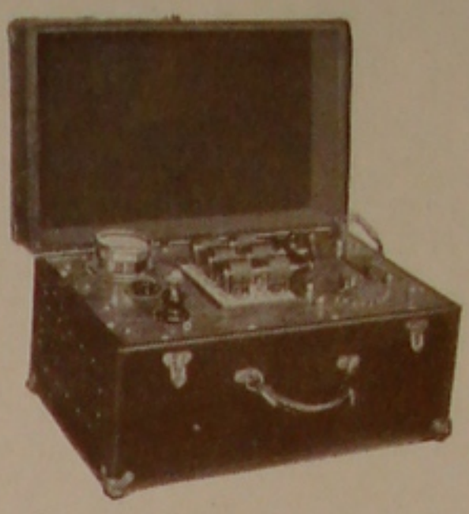
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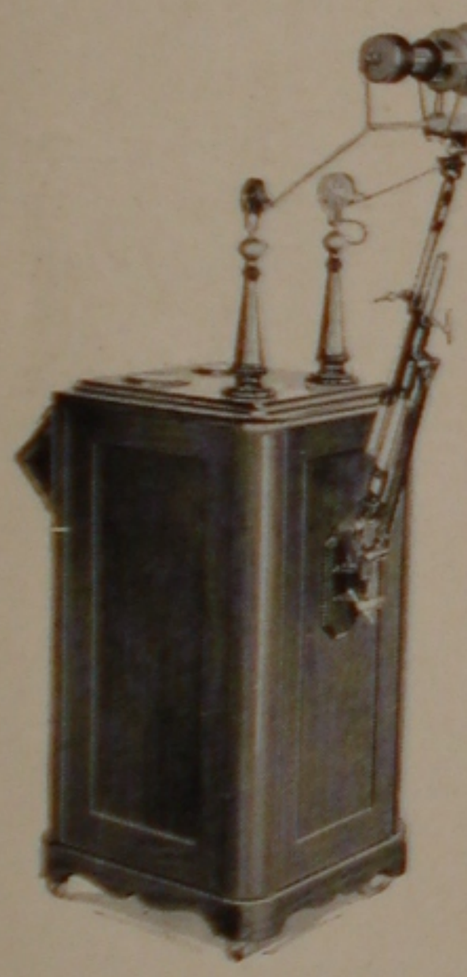
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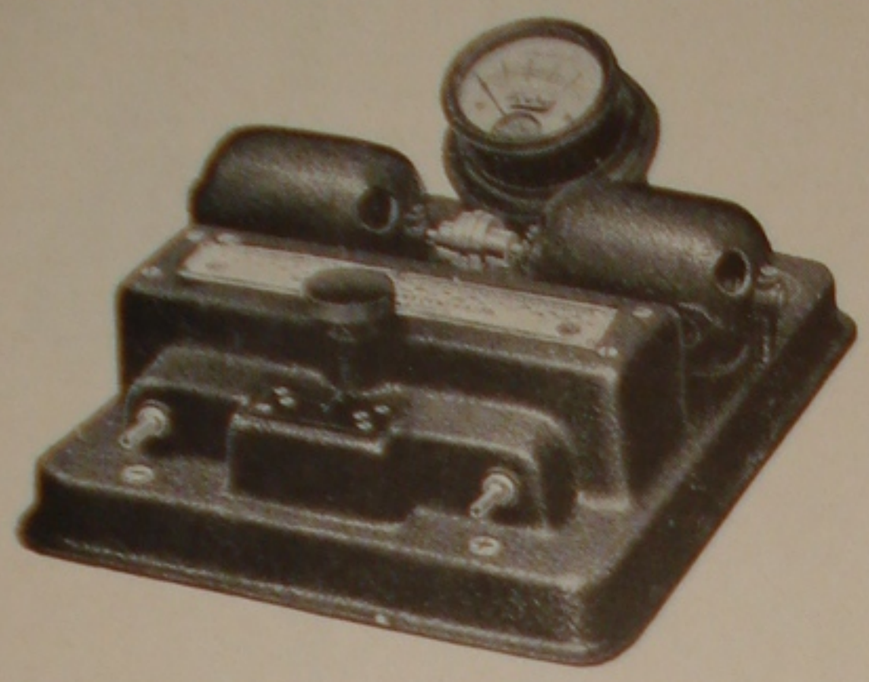


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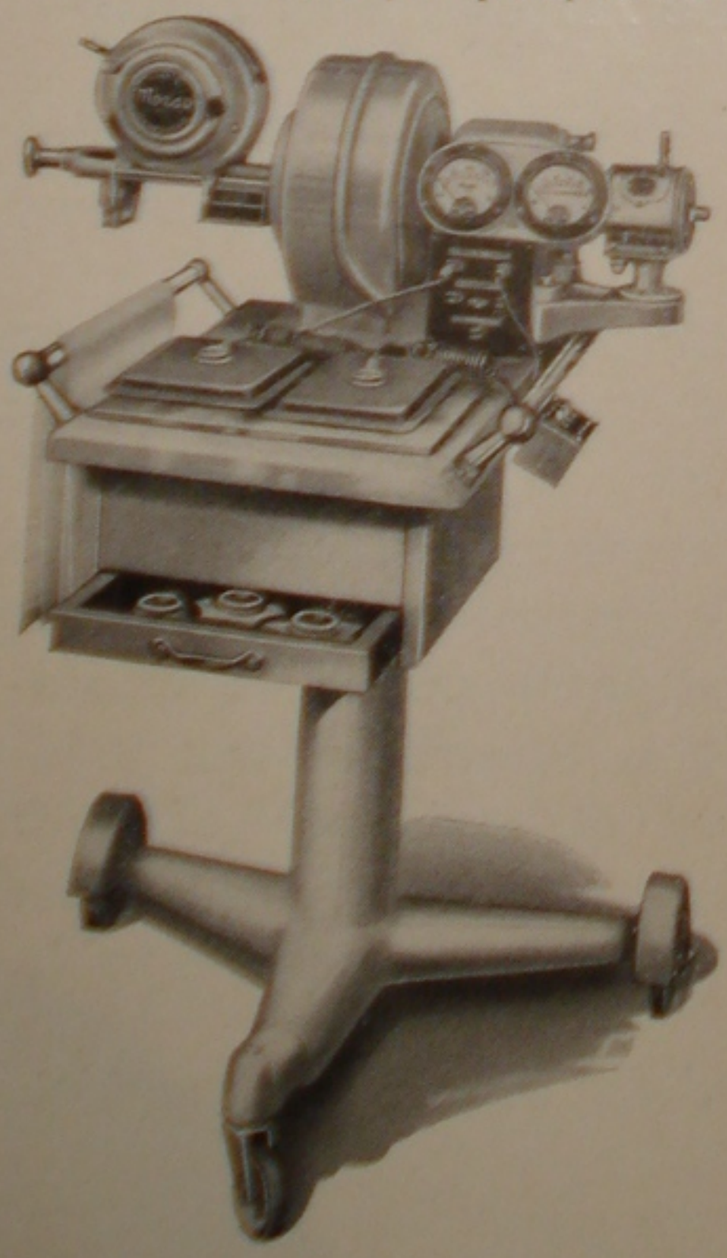
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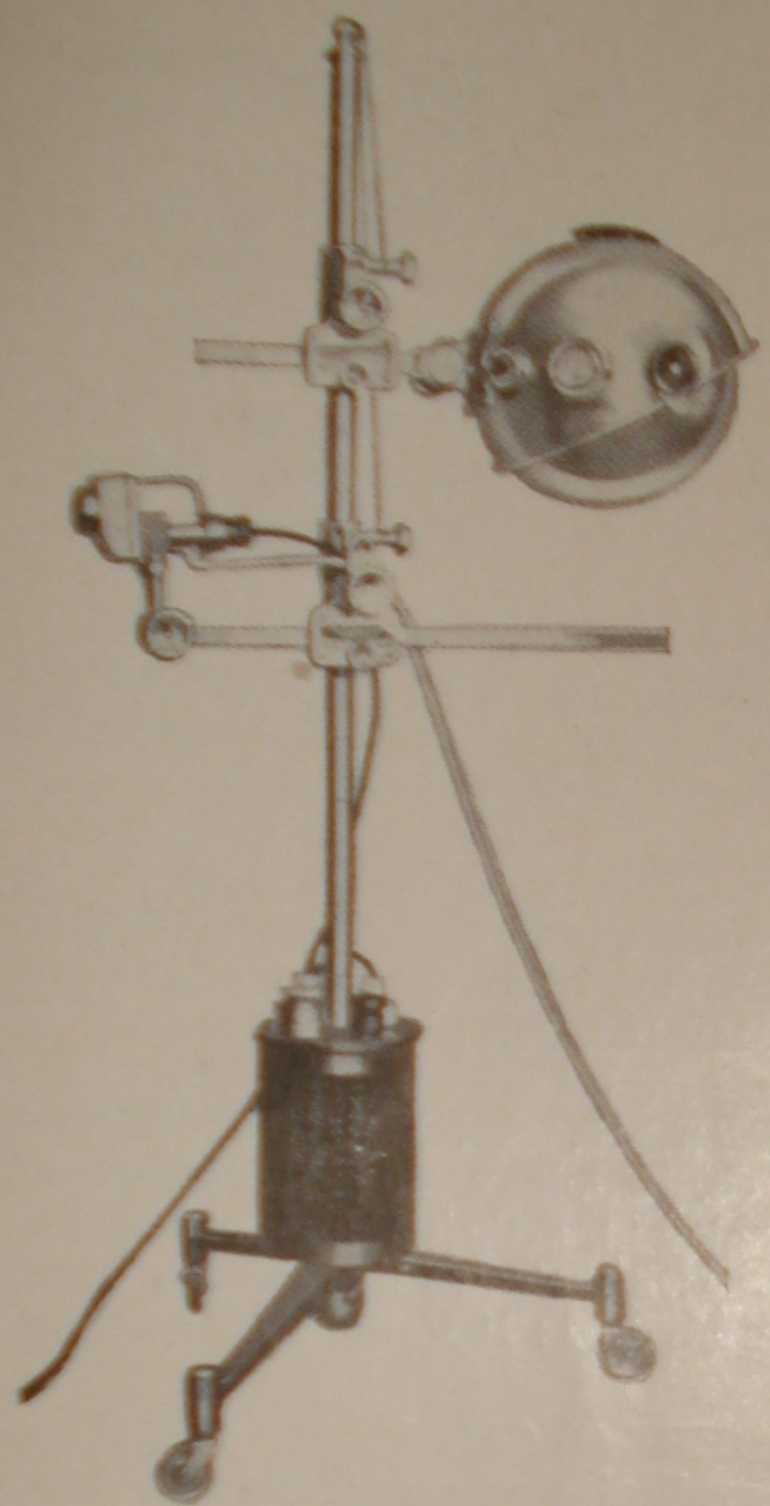


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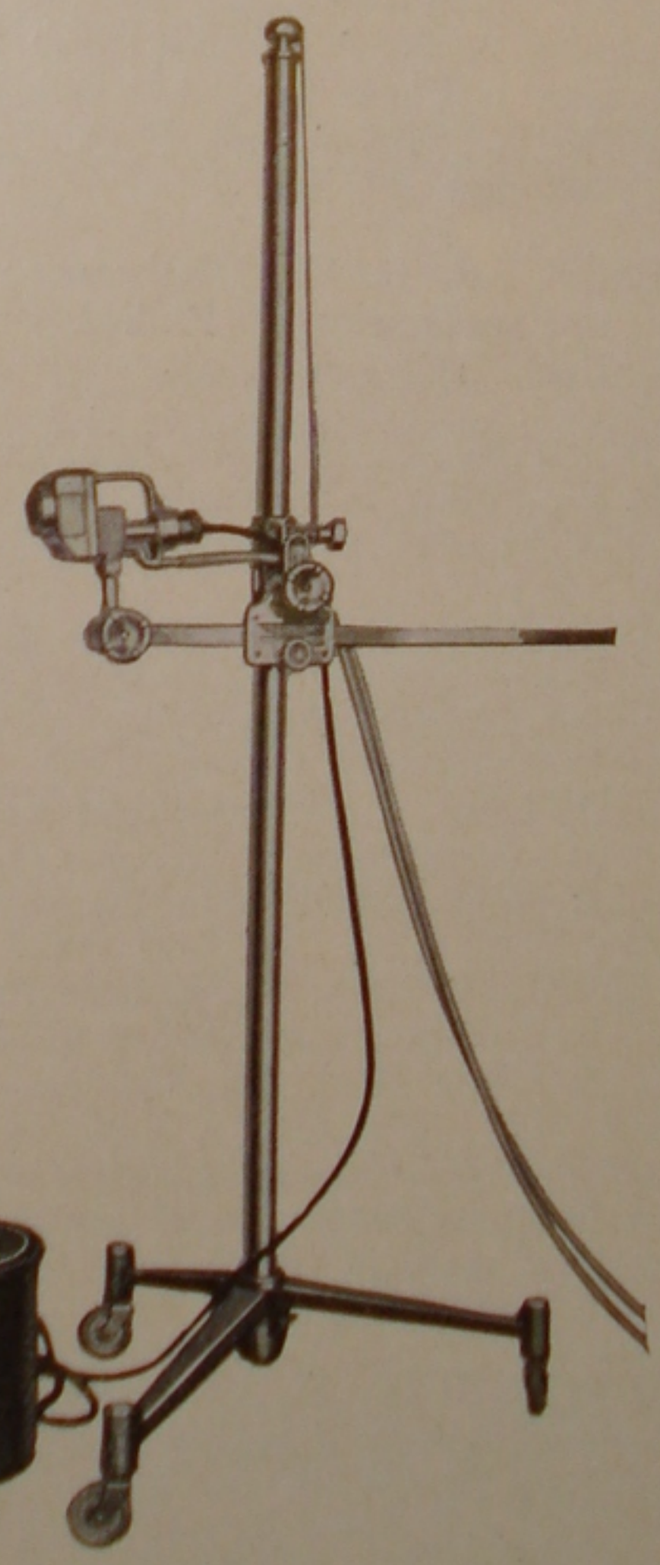
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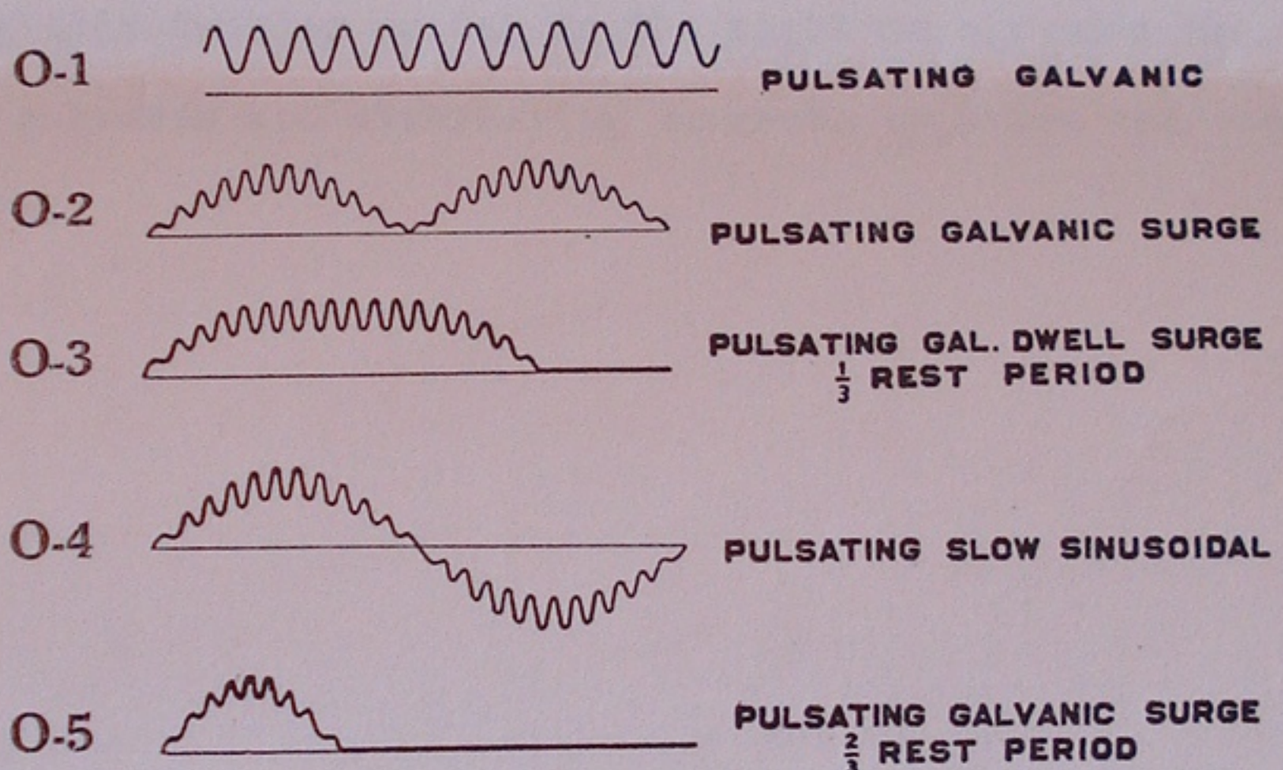
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COMBINATION GALVANIC AND ALTERNATING CURRENTS

While in our regular literature covering the Improved Model "J" Galvanic and Contractile Currents Generator and the instructions covering same we refer to ten different currents only, it is possible by the simple throwing of a switch to provide the combination of both galvanic and alternating currents as indicated by the following graphs.



To obtain this combination with galvanic and alternating currents, remove cover from back of cabinet. On the metal shelf which supports the vacuum tubes is mounted a tumbler type switch. Move the switch lever to the right - then replace the back cover onthe cabinet. A combination of galvanic and alternating currents may now be obtained by setting the current selector "B" to position "O". All the other controls are operated in the usual manner as covered in the general instructions.

Current selector "A" may be set to any of these five positions - to

obtain non-surging dual current on position "1"

to obtain surging dual current on position "2"

" " dwell surge dual current on position "3"

" " rapid surging dual current on position "4" - and a rapidly surging dual current with 1/3 active and 2/3 rest period on position "5".

Volume controls are regulated to obtain the desired amount of currents, as indicated under general instructions. The current selector "B" may be set on either position "1" or "2" and the same respective currents will be obtained as covered on general instructions.

The position of the tumbler switch inside the cabinet does not affect in any way the currents obtained with selector "B" as in either "1" or "2". Moving this tumbler switch to the right merely adds the dual combination of galvanic and alternating currents to those ten currents already available.

The Constant Current

The extreme importance of the Galvanic Current in the practice of modern medicine is recognized by the majority of physicians of today, in gynecology, urology, etc., for depilatory work, ionization, rectal lesions, electrolysis, strictures, etc., etc.

There is nothing new that can be said of the constant current which is the fundamental electric force. Whatever therapeutic effects may have been noted by various operators with the direct current, it can in no way change certain physiological and chemical established actions and reactions that alone apply to the direct current.

The effects which concern the physician most are (1) physiological and (2) chemical. It is possible that there are physiological effects due to the nervous stimulus, which can be distinguished ideally, at least, from those due to direct chemical or physical action.

There are four ways in which electrolysis can affect, in the living body, such tissue as muscle by its chemicophysical action:

(1) By the chemical effects of the products liberated at the electrodes or in the substances of the tissues.

(2) By the removal of electrolytes, chiefly inorganic substances which are necessary for the vitality of the tissues, leading to increased absorption of the elements, and perhaps, in consequence, to increased activity of the general nutrition in the tissue, or if the action be more intense, to diminish vitality, degeneration, and death.

(3) By cataphoresis, leading to increase of transferred substances around the negative, and diminution around the positive, and the consequent increase of eliminating or absorbing activity, by which a tissue returns to healthy equilibrium, or to any of the results which follow the disturbance of equilibrium beyond the limits of health.

(4) By raising the local temperature in both cases, but the physiological change may be very different.

EFFECTS OF THE CONSTANT CURRENT

POSITIVE

Physiological-sedative.

Physio-chemical: Accumulation of the negatively-charged ions of oxygen and chlorine.

Formation of an acid caustic, i. e., sulphuric, hydrochloric, nitric, and phosphoric acids.

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Cataphoric: Loss of hydrogen and basic ions; loss of fluid, coagulation.

Starvation of tissues.

Production of a dry, hard, and non-retractile eschar.

Diffusion of ions of oxidizable metal electrodes or ionized solutions.

Antiseptic: First effect of current ischemia; second, hyperemia; but much less marked than at negative pole.

NEGATIVE

(a) Physiological-stimulating.

(b) Physio-chemical: Accumulation of the positively-charged ions of hydrogen, sodium, potassium, calcium and ammonium.

Formation of an alkaline caustic, i. e., the hydrates of sodium, potassium, calcium and ammonium.

Production of a soft, retractile eschar.

Cataphoric: Accumulation of fluid and basic ions.

With mild current nutrition promoted; with high currents denutritive effect.

Anaphoric: Ability to diffuse the positive ions of certain chemical.

Antiseptic moderately. First effect of current, eschemia; second, hyperemia; ultimate effect, equalization of circulatory conditions.

By reason of this physio-chemical polar action, it may be readily seen that the physiological action is both sedative and stimulating; sedative resulting from contact with positive pole because of the cataphoric transfer of the ions of hydrogen and the bases from the region of positive polar contact to and towards that of negative contact, and stimulating at the negative by the increase in that region of fluid and positively-charged ions, which mean at once a hyperemia. By reason of this increased blood supply, stimulating and ultimately nutritional effects follow.

The characteristic action of the positive pole in relation to circulation is one of vasomotor constriction and of the negative one of vasomotor dilation.

The action of the physical effects of the current may be formulated as follows: Electrolysis chemically and cataphoresis mechanically alters the amount and distribution of salts necessary to the proper nutrition and function of the various parts of the living organism. By the latter is a direct transference of the fluids and salts by way of the cell walls, muscle septa, coats of blood vessels, sheaths of nerves, skin, serous and mucous membranes, in fact, all animal membranes which from the physical point of view are all the very best kind of porous diaphragms.

Primarily this action takes place throughout the tissues interposed between the electrodes (not necessarily the nearest way, but along the path of best conduction), but secondarily its influence is felt beyond the interpolar region. Just as it is impossible for a local hemorrhage to exist without its influence being felt beyond the immediate site of the hemorrhage, just so it is impossible to drain a part cataphorically without the influence extending, even to the entire organism.

This physical effect may be carried to the extent of completely cutting off the blood supply, thereby causing immediate and actual destruction (electrolysis of a mole); or by interfering with it to such an extent that there is no channel left by which the inorganic constituents and proteid nutriment can be conveyed to the part with which to feed it, and death from starvation ensues (absorption of an organized inflammatory exudate or an interstitial uterine fibroid); or, in lesser degree, only the normal ionization and osmotic action characteristic of living tissue and necessary to nutrition and normal function. In this latter instance the same physical effect of the current result in a stimulation of normal chemicophysiological processes, i. e., the movement from ion to ion throughout the interpolar circuit, the bodily transfer of complete neutral molecules, and the normal non-electric osmosis.

By this action nutritive changes are initiated and, by a sufficiently frequent repetition of the use of the current, are subsequently fully established. The one condition or the other will obtain according to the quantity of the current and the manner of its use, that is, whether a strong or mild current is used, and whether the application is characterized by current distribution or current density.

The use of a strong current of short duration, characterized by a current density, has either an intense irritant or else a destructive action whereas the same current, if characterized by current distribution, will produce an entirely different effect, because by reason of the increased electrode contact (square inch area), the energy expended in each square inch of surface is diminished in proportion to that increase.

A mild current, if long continued, will cause a profound change in the amount of fluids and salts in a part, and in this physical fact is to be found the therapeutic indication in pathological states, whether characterized by a diminished

or altered blood supply, under nutritive activity, pelvic exudates, a benign degenerative process, or by an excess of fluids, as in a sub-acute rheumatism, for example.

Distinction Between Cautery and Electrolysis

Galvanocauterization and electrolysis must not be confounded. In galvanocauterization, use is made of a large quantity of electricity passing through a substance of high resistance, as a platinum loop. The platinum loop, by the transformation of electric energy into heat energy, becomes heated, and it is the heat and not electricity that is utilized in galvanocauterization. The tissues, by the action of galvanocauterization, are destroyed en masse, without any regard to their chemical composition.

In electrolyzing animal tissues, heat is not an element to be considered. There is no more heat than can be accounted for by the activity of the chemical processes going on. The chemical activity in a galvanic cell depends on the strength of the current. In the same manner, the amount and activity of electrolysis in any tissue depends on the current strength sent through the tissues, and the length of time the current is passing.

When electrolysis alone is desired, the electrodes must be composed of some material not acted on by the galvanic current. In this case, the positive pole should be made of some non-oxidizable material, as platinum, carbon, or gold. The negative pole is not acted on by the galvanic current; its composition is therefore a matter of indifference.

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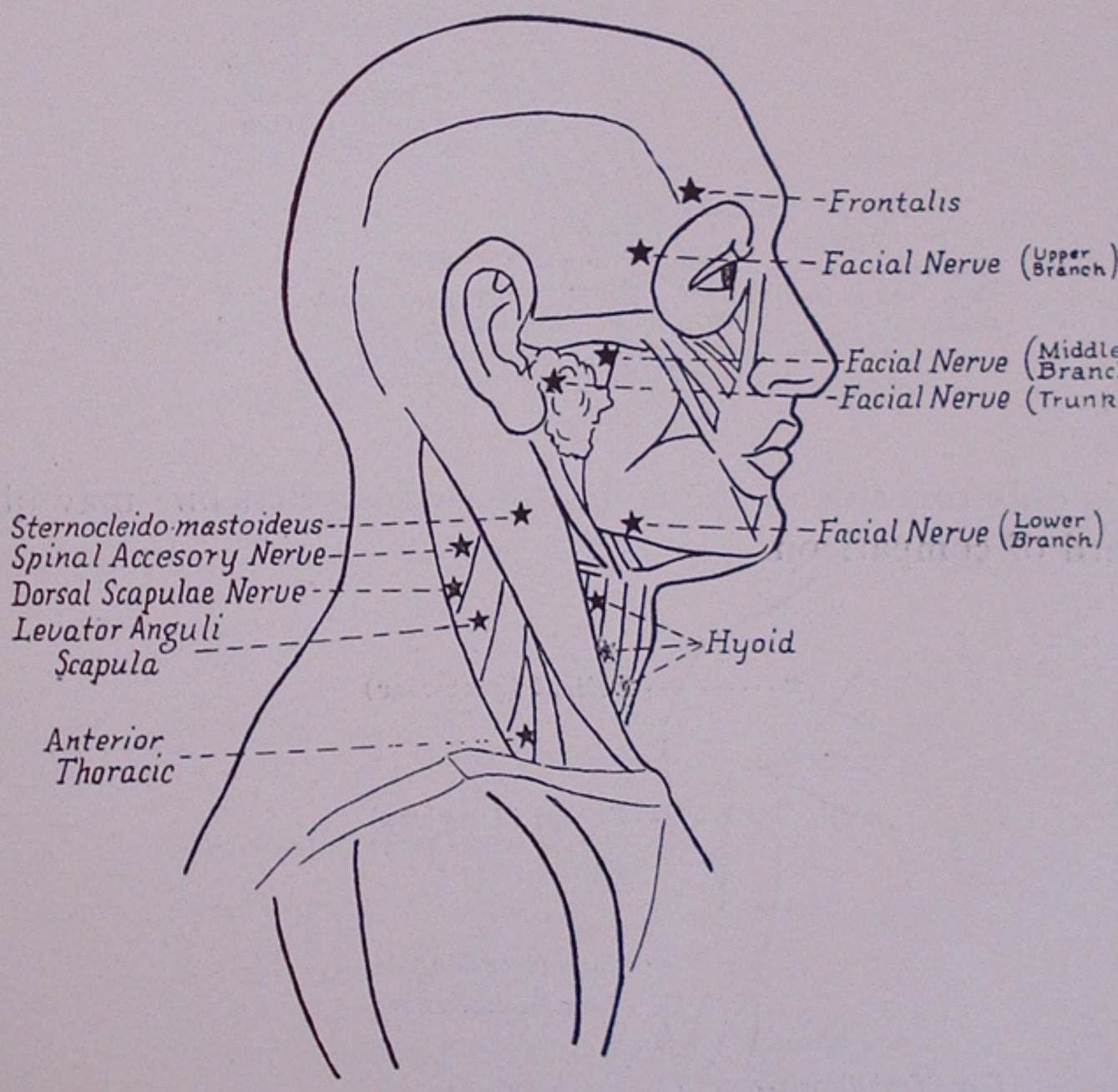
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Use and Explanation of the Fischer Electro-Diagnostic Charts

The Fischer Galvanic and Contractile Currents Generator affords an excellent means for making correct electrical diagnosis to determine the degree of paralysis and reaction of degeneration.

The following general rules must be observed.

The principal requirement of this method is to localize the current of required density and strength upon parts of the body marked

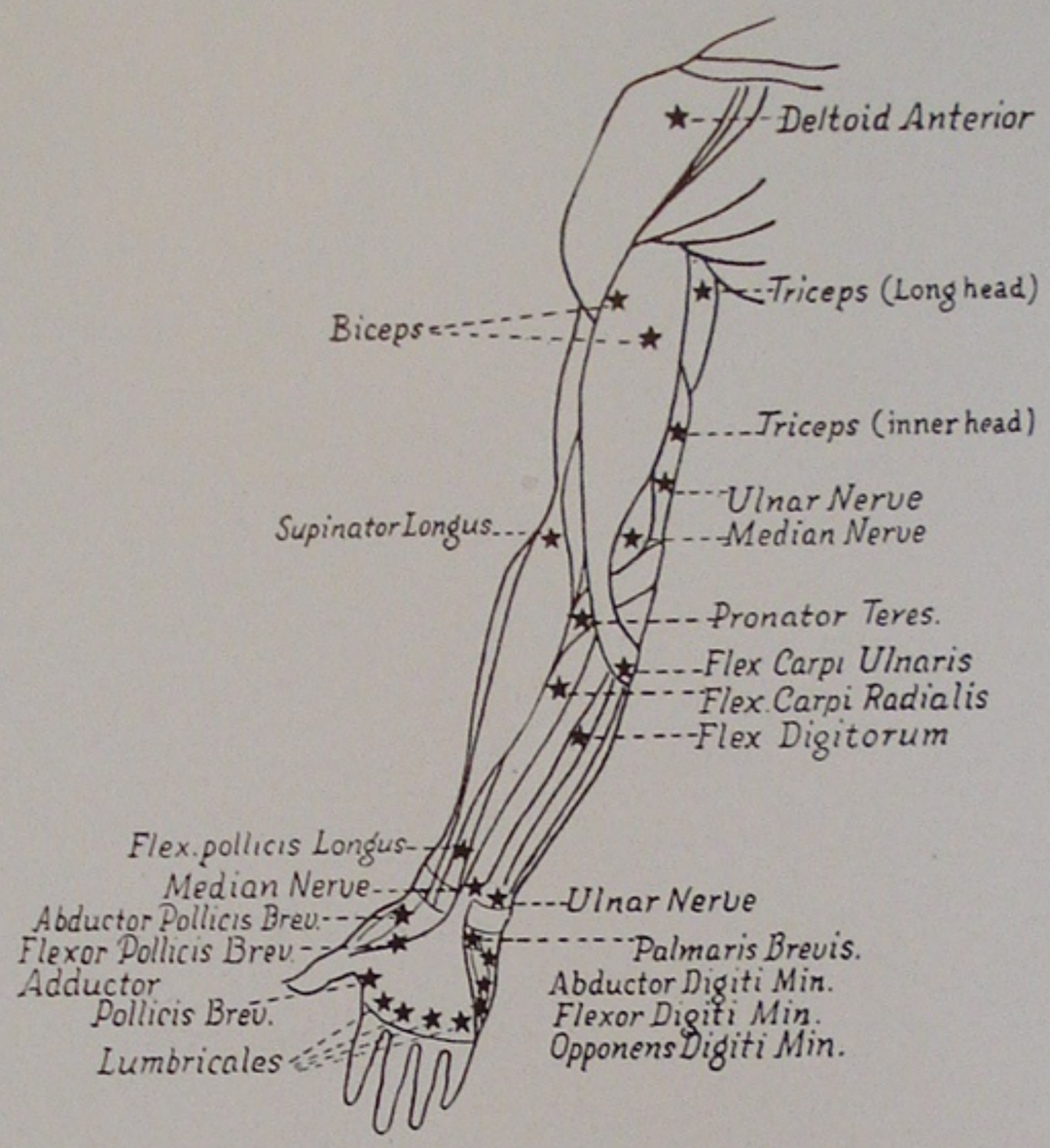


for investigation, avoiding as much as possible unnecessary excitation of the neighboring structures.

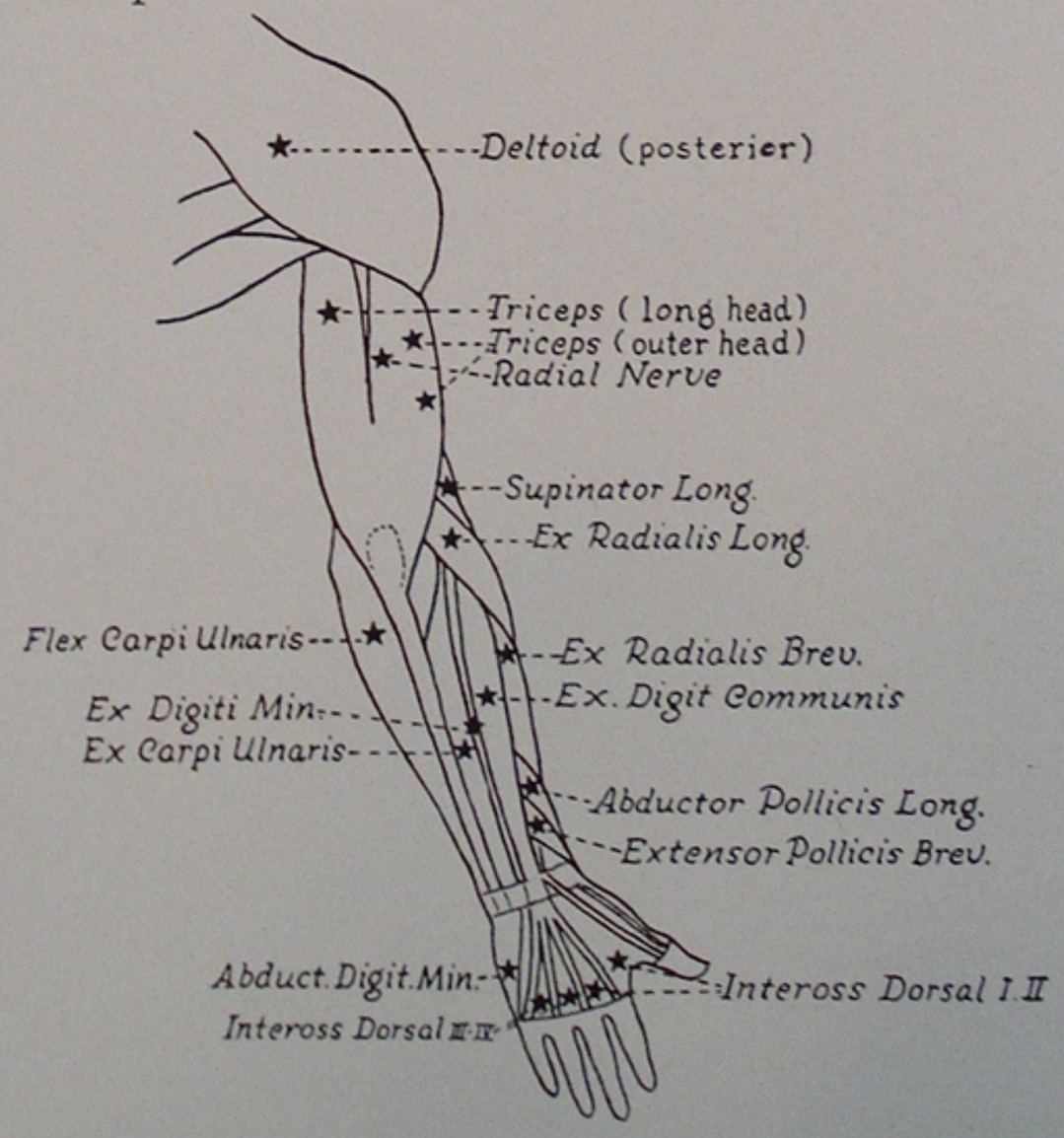
One pole or electrode only should be used for each muscle or nerve reaction expected, and while it is necessary to have a second electrode somewhere to complete the circuit, it is desirable to place this second electrode so as to eliminate effects at its point of contact. It is called the indifferent electrode. It should be much larger than the exciting electrode, which must be of the proper shape and size (usually one inch long by one-half inch wide) not to overlap adjacent tissue.

The operator should become fully familiar with his apparatus

and practice by experimentation, possibly upon himself, so as to secure dexterity in manipulation. To secure accuracy in the interpretation of his results, it is advisable to test healthy parts, especially

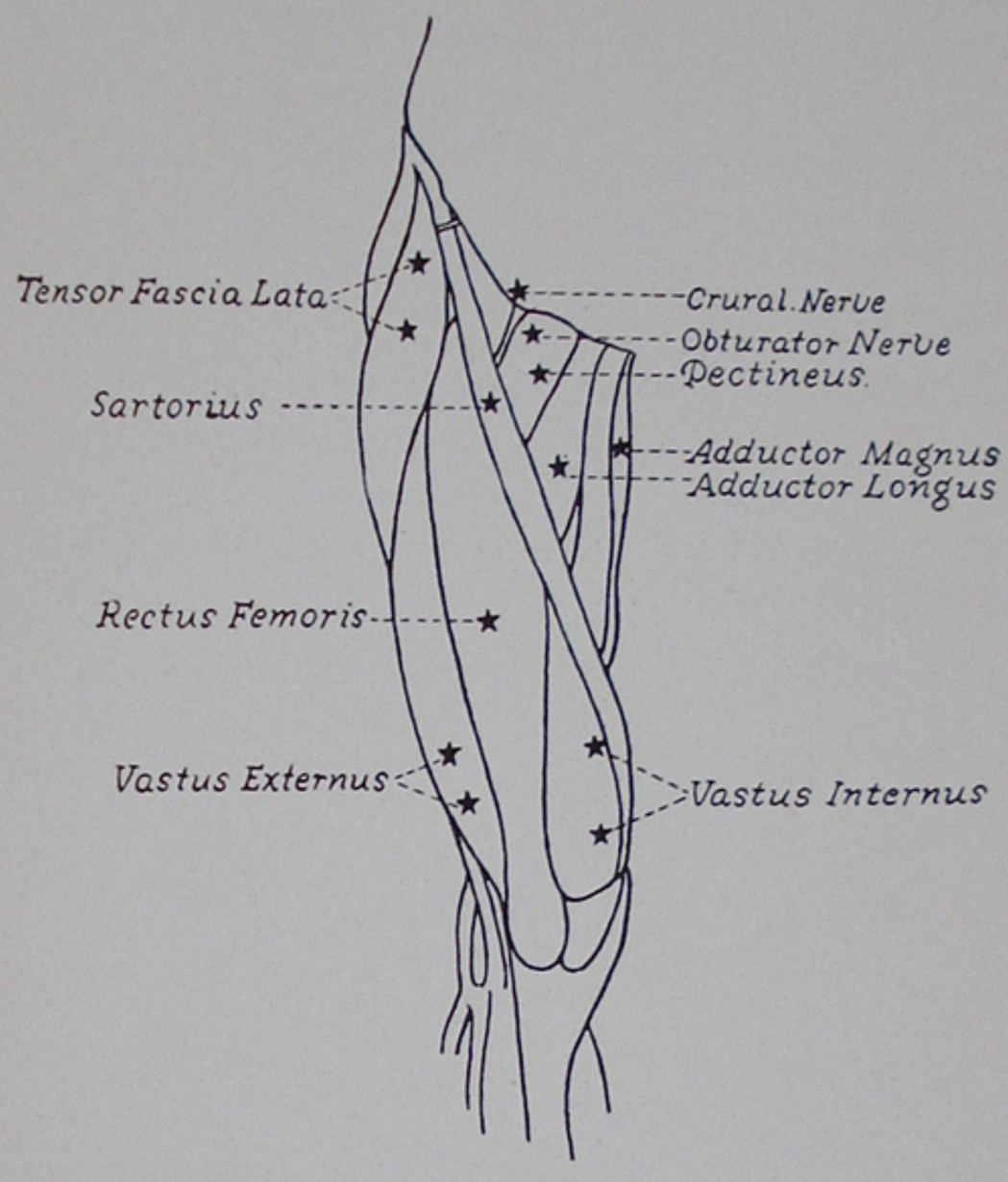


if there is only one side of the body diseased, so that one may obtain a standard of comparison.

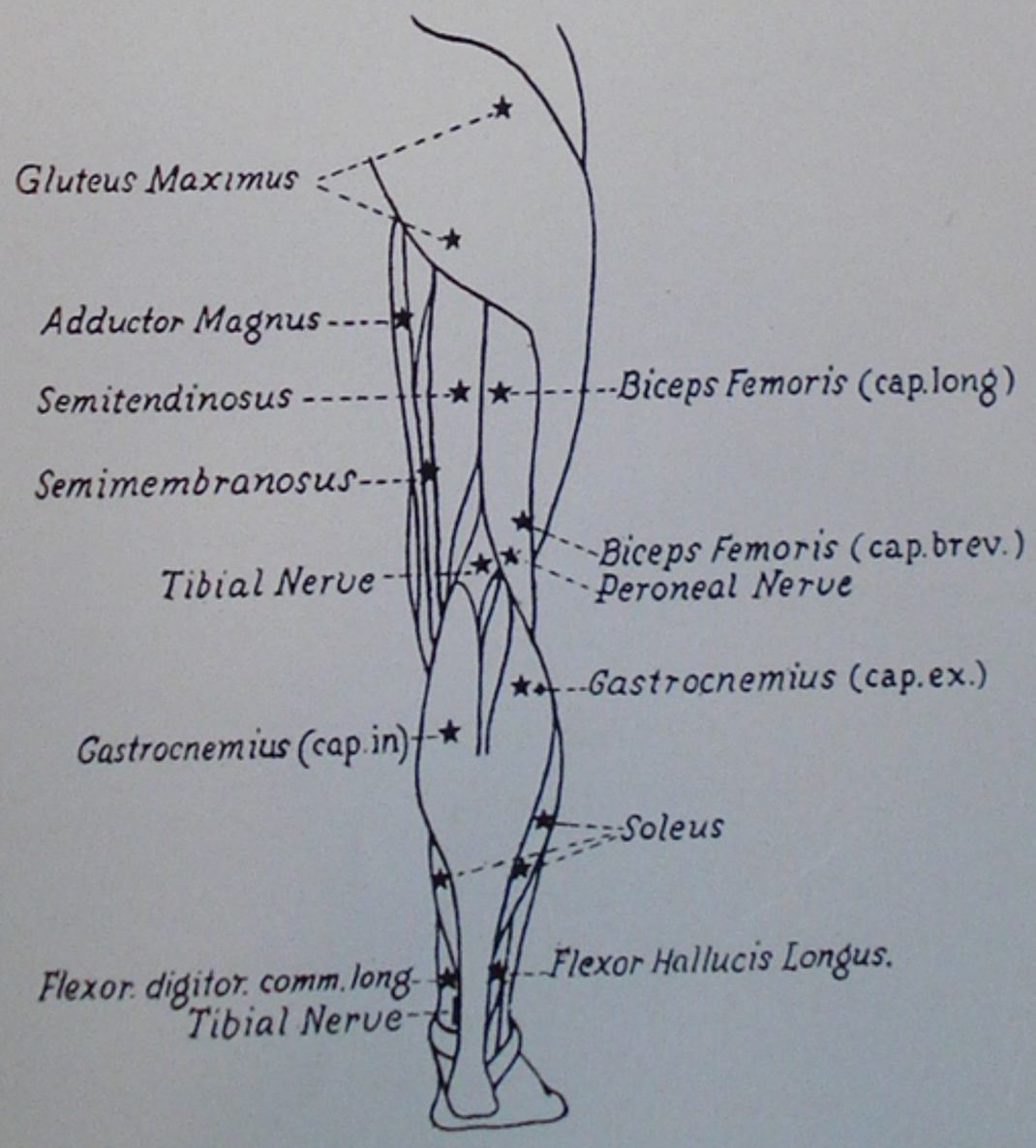


It should always be kept in mind that deeper and more pronounced contractions are obtainable by the pulsating direct current than the others. To determine the strength of the current to be used,

the resistance of the parts under examination indicated by the distance between the poles and the degree of paralysis must be considered.



You will observe in the charts reproduced, stars marking the motor points of the muscles and the exits of important nerve trunks, at



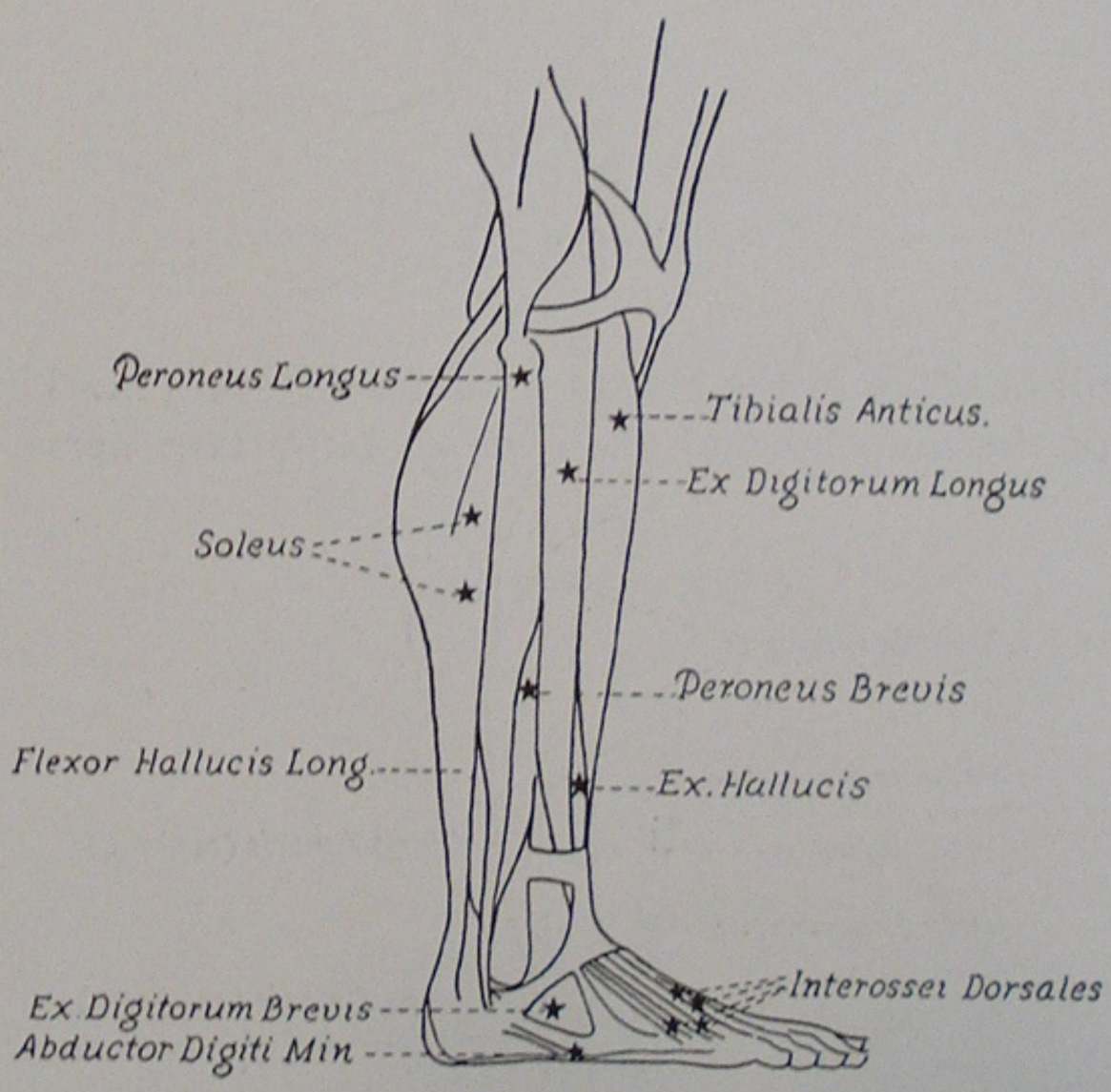
which points electrical susceptibility is the greatest. Application to any of those points about the facial muscles would be more susceptible and less current, therefore, would be required than would be

necessary in a similar exploitation of the deltoid muscles or along the sciatic nerve, or similar comparisons in different parts of the body. Reactions are different for different parts of the body, for different patients, also they are modified by disease, either increased or decreased. In sensory involvements, motor reactions may be produced without the patient experiencing much sensation, if any.

Electrical applications to a nerve exit or muscle motor point to determine the amount of excitation should be placed on the spot indicated, by means of the interrupter handle electrodes. This is the better method, although sudden, direct contact is also possible.

Do not move the active electrode in an indifferent manner over the area under examination, as that is not only unsatisfactory, but likely to give the patient an unpleasant muscle contraction.

For all the muscles about the face and neck, the indifferent or

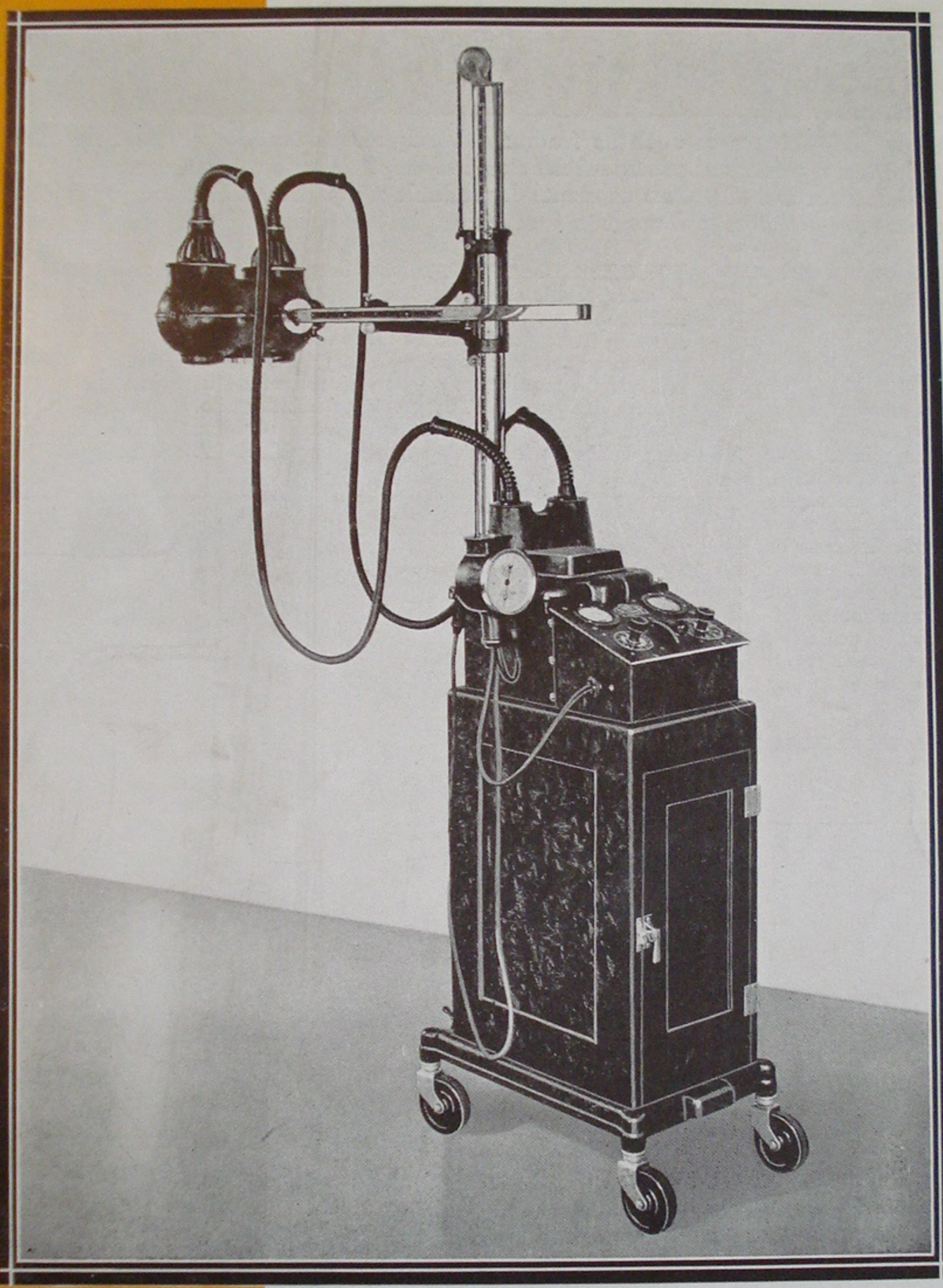


larger electrode may be placed over the lower cervical or upper dorsal vertebra and the various points determined from that.

In the examination of the arm the indifferent electrode may be placed over the nerve supply on the back and the active one over the nerve or muscle or set of muscles, under consideration. If one muscle only is involved, the indifferent electrode may be fastened at the upper insertion of the muscle and the active one applied at the motor point below.

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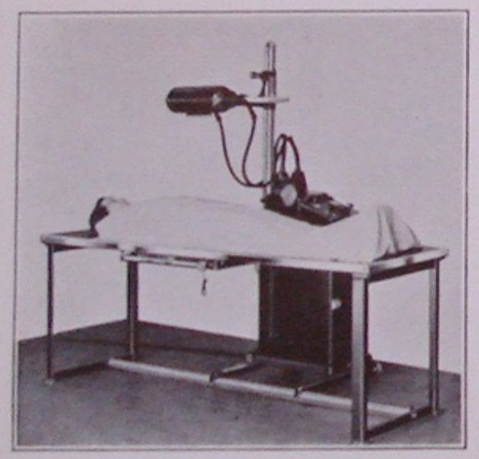
In making diagnoses — in cases such as fractures, foreign bodies, pathology of heart, lungs, stomach, colon, sinuses, treatment of superficial skin lesions, fluoroscopy and so on — how often have you wished for the aid of an efficient, dependable x-ray unit, either as a complete office equipment or as a mobile supplement to some larger installation?

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A Supreme Value in Diagnosis

The diagnostic value of an x-ray apparatus in medical practice needs no comment. It is universally recognized. Both radiography and fluoroscopy have value. Heretofore the chief obstacle preventing many physicians from installing x-ray equipment has been lack of office space or possibly cost of the apparatus. This new FISCHER Model "DSP-20" Shockproof X-Ray Apparatus overcomes both difficulties. The unit is amply powerful, efficient and dependable, and the necessary investment within the means of any physician.

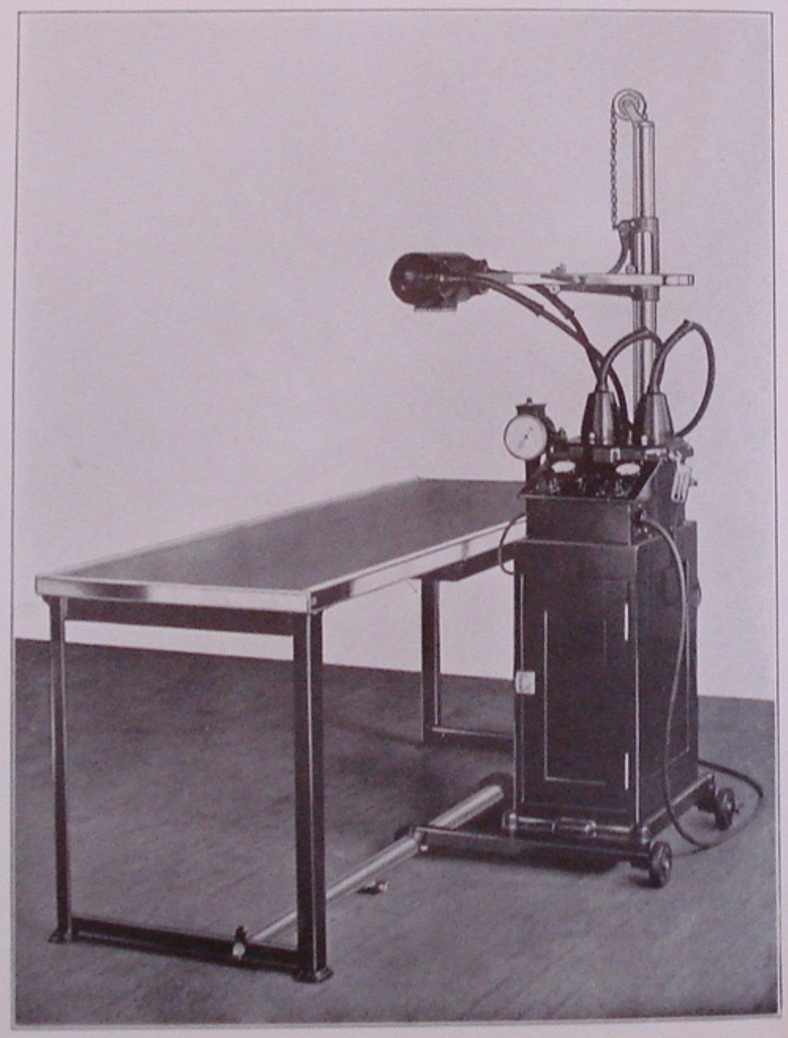
FISCHER Model "DSP-20" not only is claimed to be, and is, an all-diagnostic radiographic apparatus, but in speed of exposure and detail and contrast of radiographs produced it gives marvelous performance. A superb chest radiograph showing finest detail, can be made in 1/5 second. This result speaks for itself. A knee or shoulder radiograph may be made in ½ second. Stomach or colon radiographs require only ½ to ¾ seconds. These figures are accurate for an average-size patient. The greatest flexibility also is provided in this unit. The tubehead readily adjusts to any required position and locks fast. An aluminum filter is always in position in the x-ray field. A special holder is provided to accommodate compression cones. When table and Bucky are included, FISCHER Model "DSP-20" is mounted on a special carriage that provides easy movement the full length of the table. Fluoroscopy is also available in either vertical or horizontal positions, using a hand or operating fluoroscope.



FISCHER MODEL "DSP-20" IN ARRANGEMENT WITH TABLE

Large view (right) shows FISCHER Model "DSP-20" with table. This is a full (78") length table with Bucky diaphragm. Tube moves horizontally full length of table, vertically to top of upright (56" above table) and in and out full width of table. Locks firmly in any required position. Tubehead lowers under table for fluoroscopy.

In the small illustration above, tubehead can be raised to required position — timer and controls handy and visible. No competitive unit permits a flexibility or results exceeding FISCHER Model "DSP-20".



★ ★ ★

Positively Shockproof for Both Patient and Operator When properly grounded, FISCHER Model "DSP-20" is positively shockproof — safe for both patient and operator. The insulation is sufficient to withstand voltages far beyond anything that can ever develop in use. The high-tension cables are metal protected to prevent damage to the insulation and to assure long service without annoyance or trouble. They are so mounted that they are always out of the way. Another feature is the almost noiseless operation of the unit.

Recommended as Original Installation or as Supplementary Unit This unit provides for every demand of mobility. It may be had as a mobile unit without table, or mounted with table (in relatively fixed position and on a special ball-bearing carriage). Either arrangement, depending on needs, will prove wholly satisfactory. In many instances, this model is used as an original installation; at other times it is installed as a supplementary, mobile unit to a large fixed installation. The various arrangements are illustrated on this page. The flexibility of this unit is such that any position desired for radiography or fluoroscopy may be readily established and firmly locked. The tubehead, with lead-lined cabinet mounting, may be extended approximately 70" above floor, or lowered under table as desired.

Superior Power — Delivers 20 M.A. at 67 P.K.V. FISCHER Model "DSP-20" will deliver 20 M.A. at 67 P.K.V. — and operates on a 110 volt, 60 cycle line. It can be plugged into the regular wall outlet. For purposes of comparison with competing units, FISCHER Model "DSP-20" has much greater speed on exposures. The value of this feature in producing contrast and detail in radiographs is obvious.



FISCHER MODEL "DSP-20" AS MOBILE UNIT

Above illustration shows FISCHER Model "DSP-20" as mobile unit, mounted on free-rolling casters. These casters have composition tires to protect fine floors. The large cabinet is lead-lined and provides ample space for storing all sizes of films up to and including 14"x17" size. The tubehead is accurately counterbalanced and is fully flexible. It locks fast in any required position. The finish shown on this unit is black Kristokrak with metal parts in chromium. Compactness and stability are marked features of this apparatus.

Interested physicians, hospitals, or clinics are invited to give very careful consideration to the illustrations shown herewith and to the list of features of construction and operation on back page. Special attention is called to the figures, given below, showing typical FISCHER Model "DSP-20" performance. Read carefully the list of features of construction and operation given on back page.

Table Showing Typical Model "DSP-20" Performance

The following figures are accurate and accurately measure the performance of FISCHER Model "DSP-20." They are for average patient. A complete performance or EXPOSURE chart is shipped with each unit. If anything, Model "DSP-20" exceeds the chart rather than falls short in performance.

PART	TIME	PART	TIME
Wrist	2/10 sec.	Lat. Head	1 sec.
Ankle	3/10 sec.	A. P. Head	2 sec.
Knee	5/10 sec.	Hip	1 sec.
Shoulder	5/10 sec.	Stomach	5/10 sec.
Chest	2/10 sec.	Colon	8/10 sec.
Spine	8/10 sec.	Dental	1 sec.



FLUOROSCOPY OF EXTREMITIES

Above illustration shows use of FISCHER Model "DSP-20" in fluoroscopy. With a hand or operating fluoroscope, excellent results are possible. Tubehead turns readily into position for either vertical or horizontal fluoroscopy.

Outstanding Features of CONSTRUCTION *and* OPERATION

The following points of construction and operation of the FISCHER MODEL "DSP-20" Diagnostic, Shockproof, X-Ray Apparatus show its unquestioned superiority in its field.

1. Positively Shockproof . . .

Model "DSP-20," when properly grounded, is positively shockproof for both patient and operator. Any part of the mechanism, tube-head, cables, transformers, control box, and so on, may be handled or touched without shock or sensation of electrical discharge. The unit is absolutely safe.

2. Mobile or With Table as Desired . . .

Mounted on cabinet base, Model "DSP-20" is fully mobile. Arrangements with FISCHER Roentgenographic Table available when desired.

3. All-Diagnostic Radiographic Positions . . .

FISCHER Model "DSP-20" is truly a marvel in power and efficiency. All radiographic positions are provided, also fluoroscopy. Changes from one position to another can be made easily and almost instantly without tools.

4. Superior in Power . . .

Mobile units usually deliver only 10 M.A. at 53 to 57 P.K.V. Model "DSP-20" delivers 20 M.A. at 67 P.K.V. This means greater speed on exposure. The maximum kilovoltage is 67.5.

5. Extraordinary Fine Control . . .

Without dependable and fine control, good radiographs are impossible. Also repetition of results. In FISCHER Model "DSP-20," both milliamperage and kilovoltage are under very fine control, the two meters are accurately calibrated to give exact readings of performance.

6. Small Installation Space Needed . . .

The compactness of construction of FISCHER Model "DSP-20" is remarkable. One can say it is usable anywhere. When not in use the mobile arrangement can be pushed into a corner or closet. Arrangements with table are also very compact.

7. Very Simple to Operate . . .

With every FISCHER Model "DSP-20" is provided an exposure chart covering all factors of good radiography. You can follow this chart with uniformly the best results. Complete instructions are shipped with every machine. Installations made by factory-trained FISCHER dealer representatives.

8. Produces Unexcelled Results . . .

Because of its exceptionally fine control, its great power, its accurate timing, and dependable performance, results produced by FISCHER Model "DSP-20" are unexcelled by any competing apparatus. With modern films and high speed intensifying screens, this unit, for all-diagnostic purposes, will give every result desired.

9. Highest Quality Materials Used . . .

Only the finest materials obtainable are used in FISCHER Model "DSP-20." It is not a cheap machine, built to sell at a price, but a unit guaranteed to deliver every service claimed. Working parts, such as tube, meters, transformer, timer, and so on, will give dependable, satisfactory service.

10. FISCHER Hot Cathode Tube . . .

This is the latest-type, fine focus, hot cathode x-ray tube, body of leaded glass with only small aperture for x-ray exit. Tube enclosed in strong, well ventilated metal shell. Tube-head swivels, moves both vertically and horizontally and can revolve in complete circle.

11. FISCHER Electro-Synchrotimer . . .

Driven by an electrical, synchronous motor, and works accurately in 1/10 second divisions, up to 15 seconds. Has remote control switch. Times exposures with Bucky just as accurately as without. Oil immersed reduction gearing guarantees long life. Has triple settings—for use as test-switch only, or in connection with Bucky, or for exposures without Bucky.

12. Cables Metal Enclosed . . .

These cables are flexible, absolutely safe, mounted so as to be out of the way, and tested beyond any possible voltage overload in use. A woven-metal covering, enclosed in black mercerized sheathing, protects them from damage. They permit free tube-head movement. Metallic supports at cable ends prevents kinking and wear.

13. High Voltage Transformer . . .

Constructed with a liberal allowance of both core laminations and copper cross section to provide stable operation at high efficiency, under all load conditions.

14. Locks in Any Position . . .

Positive locks are provided to hold any position desired in x-ray unit setting—vertical, lateral and swiveling. Unit also locks fast to floor rail when used with table mounting.

15. Attractive Finish . . .

The standard finish is black Kristokrak and chromium, giving a general appearance very attractive and enduring. Chromium and cream ivory finish optional.

16. Lead-Lined Cabinet . . .

In all arrangements of FISCHER Model "DSP-20", a lead-lined cabinet is provided for storing all sizes of films and cassettes up to and including 14"x17" size. The utility of this feature is obvious.

17. Low Price — Convenient Terms . . .

FISCHER Model "DSP-20," as illustrated and described in this folder, is priced remarkably low. Considering power and quality, it is outstanding in its field.

Cat. No.		Code	Price
3644AB	FISCHER Model "DSP-20" mounted on lead-lined cabinet with iron base, long upright, casters, X-Ray Tube and Electro-Synchrotimer	HERBA	**$700.00**
3647AB	FISCHER Model "DSP-20" mounted on lead-lined cabinet with iron base, long upright, carriages to ride on support under Roentgenographic Table, X-Ray Tube and Electro-Synchrotimer	HERNI	**715.00**
3532	FISCHER Roentgenographic Table, as illustrated	OIKOI	**120.00**
3535	FISCHER Roentgenographic Table and Synchrotimed Bucky	ODSPO	**370.00**

H. G. FISCHER & CO.

2323-2345 WABANSIA AVENUE, CHICAGO, ILLINOIS

Printed in U.S.A

Form 1864A

Fischer
CHICAGO, ILL.

12/37



The Fischer

Galvanic and Contractile Currents

Generator

Fischer *Galvanic and Contractile Currents Generator*

Producing Fifteen Useful Low Voltage and Waved Currents



Use in Intestinal Stasis—pads are arranged on abdomen and back



Use in Otitis Media—a headband is employed



Use in Nerve Injuries—pads are arranged over nerve exits

A Fischer Galvanic and Contractile Currents Generator in your office will render a valuable double service, first—for diagnosis and second for treatment. In the way of diagnosis, the machine serves such useful purposes as testing the reaction of degeneration of nerves and muscles, distinguishing between various forms of paralysis, also between feigned and real disease. When using the machine for treatment is considered, for both galvanic and sinusoidal currents, a long list of indications have to be mentioned. Note the partial list given on the inside pages of this folder.

Used and Highly Endorsed by Many Physicians

The use of a Galvanic and Contractile Currents Generator, for the two purposes mentioned is, of course, not wholly new. Galvanic machines have been in use for more than 30 years, both in this country and in Europe. The galvanic current was in fact the first known useful electro-medical current. Scientifically timed and proportioned waves, however, are of recent development.

Why a Galvanic and Contractile Currents Generator

The number of physicians today using galvanic and contractile currents generators is very large. Many report that results are quite successful. That is why it is, in our judgment, fair to say that most every physician needs one of these units in his office. The list of ailments or conditions where the use of such a unit is indicated is very large, including especially such conditions as are listed on the inside pages of this folder. Many physicians find the use of a Fischer Galvanic and Contractile Currents Generator almost a daily essential in their practice.

A Generator with Definitely Superior Features

As to the comparative value of this Fischer unit in its field, there is little question of its superiority. The generator is simple, compact, durable, and remarkably easy to operate. It works equally well on the direct or the alternating current. The wave current desired can be produced instantly by simply turning the two control switches to the proper symbols. There is nothing to remove, nothing to add. A long life of service for the apparatus is assured.

Special emphasis is laid on the fact that the galvanic current produced by this apparatus is remarkably smooth and comparable to that from a battery source. It is absolutely without fluctuations. The sine waves are produced with positive repetition, and at any speed, current volume, or nature of surge.

Note the 9 advantages and the exclusive structural features of the New Fischer Galvanic and Contractile Currents Generator shown on the inside pages of this folder. Highest quality and long service are built into this machine. It is also backed by the well-known Fischer GUARANTEE of satisfaction in service.



Treatment of

HEMORRHOIDS

HERE are seven advantages of the method of treating hemorrhoids by galvanism. 1. There is little or no blood loss. 2. There is no danger in the removal of hemorrhoids by galvanism. 3. The technic is an office procedure. 4. There is practically no pain during treatment or post-operatively. 5. Treatment requires but a few minutes. 6. The patient loses no time from regular routine. 7. Patients who will not submit to hospitalization and surgery, generally readily consent to the galvanic method.



Painful Dysmenorrhoea and Subinvolution of Uterus—pads on lower back

Backed by FISCHER Reputation and the FISCHER Guarantee of Service

Fischer *Galvanic and Contractile Currents Generator*

Produces Low Voltage and Wave Currents. The Simple Setting of the Two Control Switches Gives You the Current You Desire

BELOW are represented the various types of galvanic and contractile currents generated by this apparatus. The current desired can be obtained instantly by turning the two lettered and numbered current controls to the proper symbols. No changes or other adjustments necessary. Below is the complete list of currents and their symbols.

A - 1 STRAIGHT GALVANIC

A-1—Straight Galvanic. The galvanic current furnished by this apparatus is smooth by test: and the infallible oscillographic records prove it. There is also an accuracy and fineness of current regulation incomparably in advance of all former instruments.

A - 2 PULSATING GALVANIC

A-2—Pulsating Galvanic. Striated muscles require a stimulating energy which approaches the character of the incompletely tetanic nerve impulse used by the brain to activate such muscles. But when the brain stimulus is cut off, as in paralysis, the substitute energy must also be incompletely tetanic in character—and here is the ideal current for skeletal muscle treatment; the most perfect approach to the kind of stimulation that the brain normally supplies.

A - 3 RAPID ALTERNATING 240 — PER SECOND

A-3—Rapid Alternating. When you sweep 240 oscillations per second through a muscle you get considerable mechanical response—exercise—but the chemical response is practically eliminated. Exactly the requirements for simple, effective muscle massage where the electrolytic chemical actions must be eliminated.

B - 1 GALVANIC SURGE

B-1—Galvanic Surge. A contracting muscle gives rise to a surging electric current which can be measured and its curve traced; and a similar current, the surging galvanic, sent into the muscle, brings about the same kind of physiological contraction of the muscle. This is the energy that proves so useful when the muscles require stimulation to assist in re-coordinating the nerve-muscle action in the recovery from degenerations—peripheral nerve injuries.

B - 2 PULSATING GALVANIC SURGE

B-2—Pulsating Galvanic Surge. When a muscle that was degenerated has begun to respond to the surges of the galvanic current (B-1), it regains its striated characteristics—and as soon as it does, it must have surges to produce contraction, and pulsations to provide that incomplete tetanic contraction characteristic of striated muscle. For the later treatment of paralysis, no other current serves as well as B-2.

B - 3 RAPID ALTERNATING IN SURGES

B-3—Rapid Alternating in Surges. When the muscle requires simply the exercise but not the additional tonic effects of the chemical (electrolytic) actions of the surging stimulus, you can instantly transform B-2 to B-3 and you have it. A correct physiological exercise with the electrolytic effects removed.



You Get These ADVANTAGES

Usable low voltage currents, each distinctive and useful for distinctive purposes (No. 8).

There is only one pair of current outlet terminals. This simplifies operation and is a great convenience to users.

The polarity indicator Switch (No. 5) enables you to reverse the direction of the current being used instantly whenever necessary.

The volt and milliampere meters (Nos. 1 and 4) are placed at angles to be instantly readable and have double scales for both light and heavy currents.

The current regulator, by means of a graduated scale, shows you at all times the volume of current passing to the patient (Nos. 6 and 7).

The speed of the waves is under perfect control (No. 10) and shown plainly by the indicator (No. 9).

The two current control switches are so arranged that any one of the usable currents wanted can be obtained instantly.

You get an absolutely straight line galvanic current, like that from batteries.

The unit is durably constructed. Includes two large supply drawers, handy cabinet space and large rubber-tired casters (Nos. 11, 12 and 13).

It can be said without any reservation that this Fischer Galvanic and Contractile Currents Generator is not excelled in convenience or efficiency by any competing unit.

C - 1 GALVANIC DWELL SURGE | REST PERIOD

C-1—Galvanic Dwell Surge. Sometimes a sustained contraction is desirable and of apparently much benefit. Bring the muscle to its state of contraction, keep it there a while, then release it. You can do it with C-1, C-2, and C-3, and with E-1, E-2, and E-3.

C - 2 PULSATING GAL. DWELL SURGE | REST PERIOD

C-2—Pulsating Galvanic Dwell Surge. This is the same galvanic dwell wave surge as described under C-1, with the added stimulating energy of the rapid oscillating current. The rapid pulsations are superimposed over the chemical galvanic current.

C - 3 RAPID ALT. IN DWELL SURGES | REST PERIOD

C-3—Rapid Alternating in Dwell Surges. If you want sustained contraction and combined tonic (electrolytic) effect, C-1: E-1 gives a long rest instead. If you need the sustained contraction for striated muscle use C-2; and E-2 for the sustained rest.

D - 1 SLOW SINUSOIDAL

D-1—Slow Sinusoidal. This is the sinusoidal current, smooth and slow. Useful for deep massage and valuable in smooth muscle treatment—as in constipation. For striated muscle, add the pulsations and use D-2; and for the rapid surges change to D-3. These are highly valuable energies, correctly proportioned and clinically effective if selected and used with proper discrimination.

D - 2 PULSATING SLOW SINUSOIDAL

D-2—Pulsating Slow Sinusoidal. For the treatment of striated muscle the pulsations of a rapidly alternating current superimposed over the slow sinusoidal wave produce a wonderful combination.

D - 3 RAPID ALTERNATING IN SURGES

D-3—Rapid Alternating in Surges. Useful for the simple exercise of muscles, and where the surges are desired more rapidly than with B-3. Surges obtainable from 12 to 84 per minute.

E - 1 GALVANIC SURGE | REST PERIOD

E-1—Galvanic Surge. Often a sustained rest period is desirable between impulses. With this galvanic surge the current is on one-third and off two-thirds of the time. The muscle is brought to its state of contraction and almost immediately released with a period of rest before the next contraction.

E - 2 PULSATING GALVANIC SURGE | REST PERIOD

E-2—Pulsating Galvanic Surge. This wave has all the characteristics of E-1 with the same rest period and superimposed rapid surges to produce a greater muscular contraction.

E - 3 RAPID ALTERNATING SURGE | REST PERIOD

E-3—Rapid Alternating Surge. If you require the effect without electrolytic complication you get it exactly with C-3; and E-3 for long rest periods. These are the currents which, when properly selected and used (as outlined by many European authorities), afford definite clinical response in the treatment of obesity.

When it is necessary to reverse the direction of the flow of the current before removing the electrodes, this can be done instantly by turning the polarity indicator switch.

Some Uses of Low Voltage Currents

Here is a list of uses for low voltage currents.

1. **Bell's Palsy—Sinusoidal.**
2. **Brachial Neuritis—Galvanism and Sinusoidal.**
3. **Sciatica—Galvanism plus Sinusoidal.**
4. **Constipation Often Relieved by Strong Impulses from the Sine Current.**
5. **Menorrhagia—Copper Ionization, Positive Galvanism.**
6. **Illeal Stasis—Surging Sine.**
7. **Chronic Supperative Otitis Media—Zinc, Ionization, Positive Galvanism.**
8. **Endocervicitis — Positive Galvanism and Zinc Ionization.**
9. **Dysmenorrhoea — Galvanism and Sinusoidal.**
10. **Mechanical Effects—Sinusoidal.**
11. **Chemical Effects—Positive or Negative Galvanism.**
12. **Cervical Erosions—Positive Galvanism.**
13. **That Stubborn Arthritis—Sodium Ionization into Joint.**
14. **Painful Feet, Look for Fallen Arches—Interrupted Sinusoidal.**
15. **Leucorrhoea, A troublesome Symptom—Positive Galvanism.**
16. **Nerve Injuries—Galvanism and Sinusoidal.**
17. **Abdominal Adhesions following Operation—Surging Dwell Wave Sine.**
18. **Painful Backs Relieved by Sine Current. One Electrode at First Dorsal Vertebrae and other on Sacrum.**

There are of course many other uses.



Home of H. G. FISCHER & COMPANY,
2323-2345 Wabansia Ave., CHICAGO, ILLINOIS

Over 26 Years of Leadership

H. G. Fischer & Co., were pioneers in invention and manufacture of electrotherapeutic equipment. Their policy through all these years has been to supply the best quality apparatus it is possible to manufacture. The Fischer world-wide reputation is ample proof of the value of Fischer products. Fischer equipment is today used in every country on the globe. It is preferred by many leading physicians, hospitals, clinics and schools. Ask users of Fischer equipment. They will tell you that this equipment is not only unexcelled but that the Fischer Company stands back of its products in every way.

Some Exclusive Structural Features

On point 1 of the Numbered Current Control the direct current galvanic generator is DIRECTLY connected to the surge controlling features, thus avoiding any and all cross connections. On point 3 the special 240 cycle alternating current generator is DIRECTLY connected to the other controlling features, again avoiding any and all cross connections. On point 2 the combination of alternating surges is impressed upon the galvanic current. Again both are DIRECTLY connected with no cross wiring.

The advantage of direct and independent connection to the two independent ground-proof generators furnishes pure unadulterated current to the surge commutator which is of special heavy copper design. The polished copper commutator with its graphite filled brushes is of unique design, avoiding all possibility of even the slightest shock to the patient. So perfectly does this combination transform into surges the unadulterated and straight line galvanic high cycle alternating currents that actual photographic tests PROVE them far in advance of anything elsewhere produced upon the market today.



1

NUMBERED Current Control. With the indicator set on either one of points 1, 2 or 3 this generator will deliver the corresponding currents as indicated in the list given above. For example, with indicator set to 1 and the lettered indicator set to A you will obtain a straight galvanic current—A-1. Setting indicator on No. 2 and leaving lettered indicator on A will produce current A-2, and so on.



2

LETTERED Current Control. This control works in conjunction with the Numbered Current Control above. You will note that these two controls make possible all the usable types of currents, that is, 15 distinctly different currents from but one set of terminal outlets. No adjustments required. You simply turn the controls to the designated symbols.



3

THE rubber-covered cords as furnished with this generator are of highest quality. Further, the patented ball joint on one end and the flat connector on the other are new features. It is impossible for these cords to become disconnected from either the machine or the electrodes unless desired. This is a very important feature for the satisfactory use of the generator.



4

NOTE the patented ball and socket terminals and the very convenient polarity indicator switch. When administering galvanism it is often necessary to reverse the direction of the flow of current before removing electrodes; hence this handy pole changer. These and many other features make the Fischer Wave and Contractile Currents Generator the outstanding value in its field.

H. G FISCHER & COMPANY

2323-2345 WABANSIA AVENUE -:- -:- CHICAGO, ILLINOIS

The Fischer Guarantee

Any defects in our apparatus that may develop within six (6) months from date of shipment under normal and proper use, due to faulty material, imperfect insulation, or careless workmanship, will be repaired or replaced at our option and our expense, provided such apparatus is delivered PREPAID to our factory. For repairs or replacements during the next twelve (12) months, we will charge only actual cost to cover, and after this period our service and our attention are to be called on when required, with the understanding that charges for overhauling "Fischer" apparatus will always remain as near actual cost as possible. We do not maintain a repair department for profit —this department is entirely for your service. We will not assume any liability for work done by others, without our consent in writing, nor for defects from improper storage. We will not assume any liability for breakage of glassware, lamps, or X-ray plates, nor for deterioration of rubber goods, X-ray films or any perishable goods. We use the best materials obtainable. Rotary converters, meters, and motors not manufactured by us do not carry our guarantee, but are backed by the guarantee of the makers.

Prices and Terms

Catalog No. 2372—The new Fischer Galvanic and Contractile Currents Generator, complete with silk-covered connecting cord and attaching plug, cabinet, and accessories, including: 1 No. 1930 Pair Rubber-covered Connecting Wires, with flat pad terminals. 1 No. 1931 Pair Rubber-covered Connecting Wires, with tips. 1 No. 1933 Bifurcated Cord with flat terminals. 1 No. 1934 Flat Pad Electrode —5x8 inches. 1 No. 1935 Flat Pad Electrode—3x9 inches. 2 No. 1936 Flat Pad Electrodes—4x5 inches. 2 No. 1937 Flat Pad Electrodes—3x3 inches. 1 No. 1847 Muscle Testing Pad Electrode—$\frac{3}{4}$x$1\frac{3}{4}$ inches. 1 No. 1897 Localizing Covered Ball Electrode. 1 No. 1823 Sigmoid Electrode. 1 No. 1825 Vaginal Electrode. 1 No. 1824 Prostatic Electrode. 1 No. 606R Insulated Handle. For operation on 110 volt, 60 cycle alternating current. Code ZEHYA. **$495.00**

Slight additional cost for machines of special voltage or cycle.
Prices quoted on request when accessories are not required.
Easy terms may be arranged.

Form 1251D

Printed in U.S.A.

Fischer
CHICAGO, ILL.

12/37



The Fischer
Galvanic and Contractile Currents
Generator

H. G. FISCHER & Co.

MANUFACTURERS

X-RAY AND ELECTRO SURGICAL MEDICAL EQUIPMENT

GENERAL OFFICE 2323-2345 WABANSIA AVE.

CHICAGO

REPRESENTATIVES
IN ALL
PRINCIPAL CITIES
AND FOREIGN COUNTRIES

CABLE ADDRESS
"FISCHERCO"
TELEPHONE
ARMITAGE 0322

May 9, 1940.

Dr. F. J. Moeninghoff,
Monett, Missouri.

Dear Dr. Moeninghoff:

We have been requested by our Mr. Charles O. Porter to give you a comparison on the McIntosh Sinustat and the Fischer Model "J", between the following currents:

McIntosh Straight Galvanic Smooth - the equivalent is obtained on the Model "J" by placing your dials on points 1 and 1.

McIntosh Galvanic Wave Uni-Directional - the equivalent is obtained on the Model "J" by placing your dials on 2 and 0.

McIntosh Galvanic Wave Smooth - the equivalent is obtained on the Model "J" by placing your dials on 4 and 1.

Galvanic Wave Rough - This appears to be a rectified AC current, but unfiltered. We do not have this current on our machine.

320 cycle Sinusoidal - the equivalent is obtained on the Model "J" by placing your dials on 2 and 1.

320 cycle Sinusoidal Wave - The equivalent is obtained by placing the dials on the Model "J" on 4 and 2.

If we can be of further service advise us.

Cordially yours,

H. G. FISCHER & CO.

P P Muskett

Vice-President.

PPM:F Z.



H. G. FISCHER & Co.

MANUFACTURERS

X-RAY AND ELECTRO SURGICAL MEDICAL EQUIPMENT

REPRESENTATIVES
IN ALL
PRINCIPAL CITIES
AND FOREIGN COUNTRIES

GENERAL OFFICE 2323-2345 WABANSIA AVE.

CHICAGO 47, ILL.

CABLE ADDRESS
"FISCHERCO"
TELEPHONE
ARMITAGE 0321

September 23, 1946

F. J. Moennighoff, M.D.
Monett, Missouri

Dear Dr. Moennighoff:

It has just been discovered, Dr. Moenninghoff, that we failed to send you the technic chart and the instructions for the operation and maintenance of your model "J" galvanic and contractile currents generator. We believe that the enclosed instructions will be of assistance to you.

You had asked if we have a service man in your territory. Yes, we do. Mr. G. H. Richardson, 405 South McGuire, Warrensburg, Missouri represents us in your territory.

Yours very truly,

H. G. FISCHER & CO.

M. A. White

M. A. White

MAW:pwr



H. G. FISCHER & CO.

2323-2345 WABANSIA AVENUE

CHICAGO, ILLINOIS

(LOGAN SQUARE STATION)



MANUFACTURERS OF

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SURGICAL - MEDICAL

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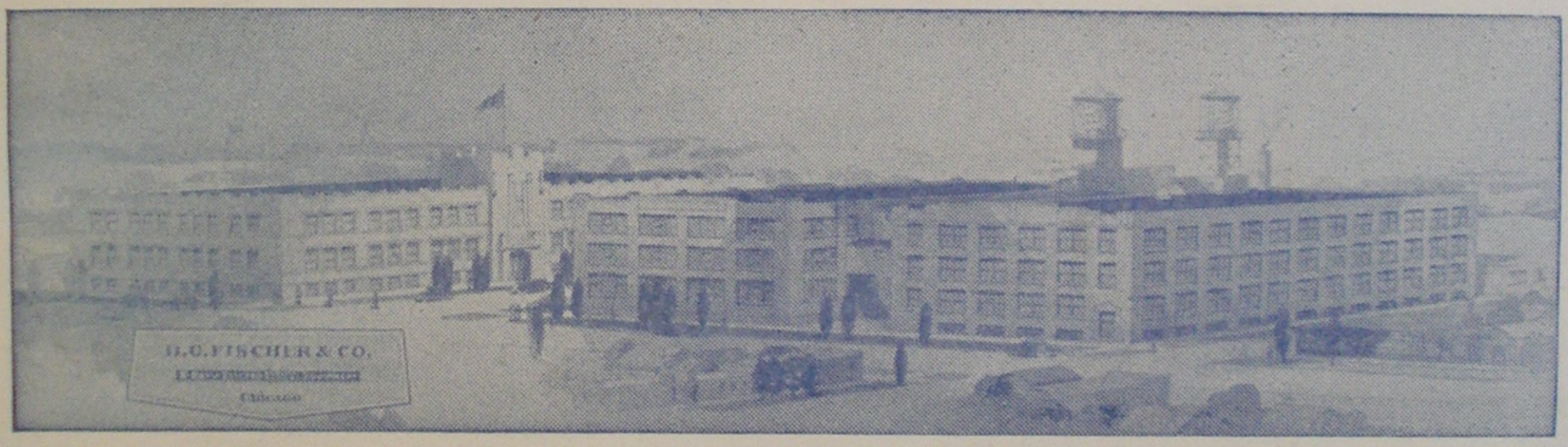
Model "J" Instruction

H. G. FISCHER & CO.

2323-2345 WABANSIA AVENUE

CHICAGO, ILLINOIS

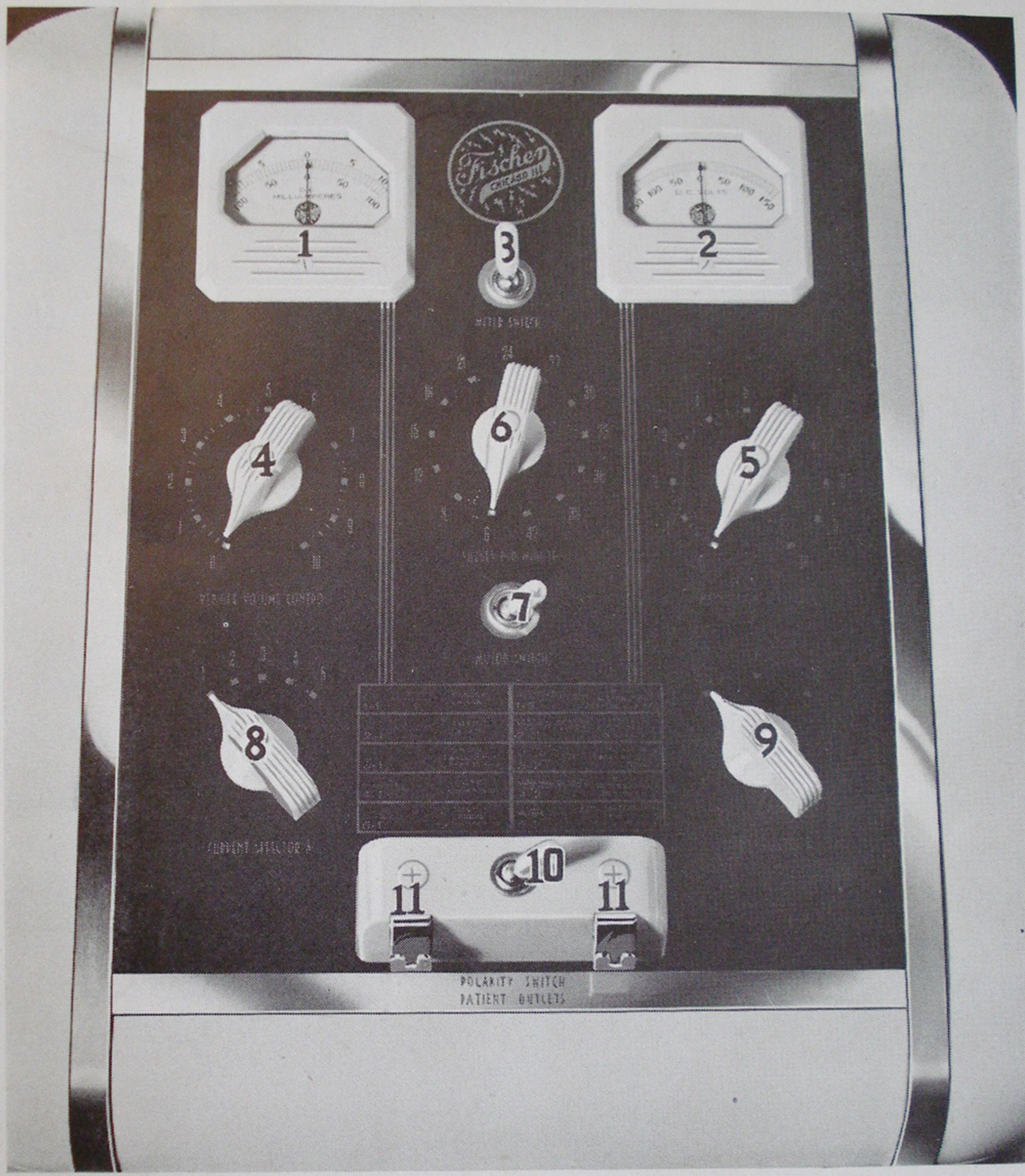
(LOGAN SQUARE STATION)



MANUFACTURERS OF

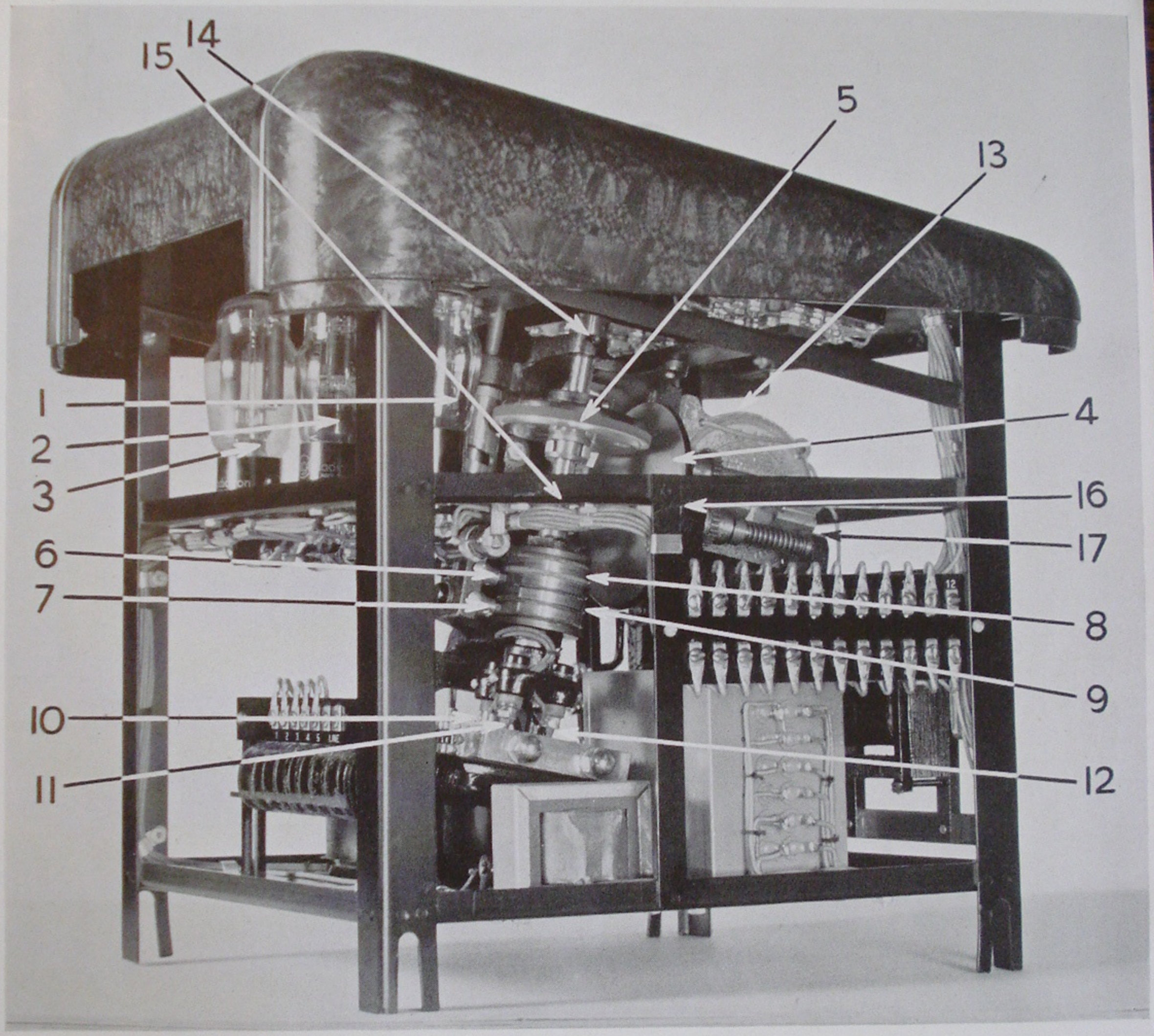
X-RAY & ELECTRO-SURGICAL - MEDICAL EQUIPMENT

RETURN POSTAGE GUARANTEED



EXPLANATION OF NUMBERS

1. Milliampere Meter
2. Volt Meter
3. Meter Switch
4. Vernier Volume Control
5. Main Volume Control
6. Surges Per Minute
7. Main Switch
8. Current Selector A
9. Current Selector B
10. Pole Changing Switch
11. Patient's Outlets



DESCRIPTION OF MECHANISM

1 — Oscillating Tube (Cat. No. 4430).
2 — Oscillating Tube (Cat. No. 4430).
3 — Rectifier Tube (Cat. No. 4429).
4 — This wheel drives No. 5. When necessary, clean with gasoline. Do not use grease or driving compounds.
5 — This wheel drives collector rings and commutator brush holders. When necessary, clean same as No. 4.
6 — This brush controls the sine wave currents.
7 — This brush controls the dwell waves (1/4).
8 — This brush controls rest period (2/3).
9 — This brush controls the galvanic surge.
10 — Commutator brush — connects to collector rings 6 and 8.
11 — Commutator brush for dwell surge. Connects to collector ring No. 7.
12 — Commutator brush for galvanic surge. Connects to collector ring No. 9.
13 — Remove Screw and put in 1 tablespoon Med. Grade low pourtest oil every three months.
14 — Oil Hole.
15 — Oil Hole in Frame immediately behind support.
16 — Oil Hole in Frame immediately behind support.
17 — Oil Hole.

B I B L I O G R A P H Y

Concerning the Uses of Low-Voltage Currents

* * *

OBLITERATION OF HEMORRHOIDS

Wilbur E. Keosey, M.D., Chicago (Arch. Phys. Therapy, Sept. 1934) says..."The advantages of this method (negative galvanism) are its simplicity, safety, and apparent permanency of cure. It is a procedure requiring neither anesthesia nor hospitalization. There are no unfavorable sequelae...Permanency of cure is due to complete obliteration of the entire vein from its point of origin to its most dependent portion...No special preoperative or post operative treatment is required for this procedure."

J. C. Webb, M. D. (British Med. Jour., March, 1921)..."There is no danger of embolism." (By negative galvanism)

TREATMENT OF ARTHRITIS

Kovacs (R) Kovacs (J) (Arch. P. T., Oct. 1934)..."Mecholyl ionization has been found a useful palliative treatment in rheumatoid arthritis where other methods of physical therapy directed to the relief of the local condition failed."

CHRONIC ENDOCERVICITIS

Richard Kovacs, M. D. (Clinical Professor and Dir. of P. T., N.Y. Polyclinic Med. Sch. & Hosp. - Author of "Electrotherapy and Light Therapy")..."This condition is notoriously resistant to topical applications and irrigations and offers an effective field for the electrosurgical destruction of the diseased gland bearing area...The simplest and mildest form of electrosurgery, suitable for almost any general practitioner's office is electro-chemical destruction by copper ionization."

D. W. Tovey, M. D. (Gynecologist at N. Y. Polyclinic Med. Sch. & Hosp., N.Y. State Jour. of Med. 30 #15, 1930) on "Copper Ionization in the Treatment of Cervicitis" reports..."The result is a lessening of the discharge; in a week or ten days it has disappeared, the cervix shrinks and after 3 or 4 treatments it appears normal. The infection, erosion, Nabothian cysts and discharge have disappeared. Large infected cervices that in the past required amputation shrink to normal."

STRICTURE OF THE URETHRA

C. J. Uthoff, M. D. (Urological and Cutaneous Review, 42-240-1938)...advocates the revival of this method (negative galvanism) for the dissolution of scar tissue in the urethra and reports very satisfactory results in organic or definitely fibrotic strictures."

ZINC IONIZATION IN THE TREATMENT OF CHRONIC SUPPURATIVE OTITIS MEDIA

Abraham R. Hollender, M. D., attending otolaryngologist, American Hosp. of Chgo. and Maurice H. Cottle, M. D., attending otolaryngologist, Illinois Masonic Hosp. at Chgo., (authors of Physical Therapy in Diseases of the Eye, Ear, Nose, and Throat) say..."Our knowledge of the benefit of zinc ionization in local sepsis is based on the original investigations of Professor Leduc of Nantes. Experience has

confirmed the views of Friel, who holds that zinc ions coagulate albumen and the electric current makes the ions penetrate to any depth required."

A. R. Friel, M. D. (Treatment of Chronic Otorrhea by Zinc Ionization- Lancet 2-345, Aug. 14, 1920)..."The coagulation of the albumen of cells, whether they are tissue cells or bacteria, involves their death. Thus the exudation is sterilized. The coagulum that is formed is moreover a sterile barrier between the tissues and the exterior. Rest is afforded to the tissues which rapidly progress toward structural integrity and functional efficiency."

ACUTE RHINITIS

A. R. Hollender, M.D. - Maurice H. Cottle, M. D...."In acute or subacute rhinitis, Thomotz advocates galvanism...The treatment produces sedative and shrinking action while the deep germicidal effect of antiseptic positive ions cataphorically penetrate into the tissues. There is no doubt that this method of treatment has many advantages. We have used it successfully a number of times after other measures had proven unsatisfactory."

ELECTRO-DIAGNOSIS

Frederick H. Morse, M. D. (Ex-Pres. of the American Electro-Therapeutic Ass'n - author of "Galvanism and Sine Current Technique")..."Electrodiagnosis, when carefully made, comparing the impaired part (arm or leg) with the healthy part on the opposite side, provides not only a definite guide for electrical application but for prognosis as well. During a series of treatments this can be periodically referred to and progress toward recovery definitely calculated. Paralyzed and semi-paralyzed nerves will often respond to a galvanic current interruption."

COSMETIC EFFECTS OF GALVANISM

Frederick H. Morse, M. D....."Physicians using galvanism have a valuable means for the removal of superfluous (facial) hairs, warts, moles, port-wine naevus, tattoo marks and the like...Negative galvanism is the ideal method. Cicatricial tissue can be relieved if not entirely obliterated by needle electrolysis and often by ionization."

NEURITIS AND NEURALGIA

A. P. Cawadias, O.B.E., M.D., F.R.C.P., Physician to St. John Clinic and Inst. of Phys. Med. in London, Eng., (The Brit. Jour. of Phys. Med., Electrotherapy Papers #6)..."In neuritis with painful reactions, and particularly in what we call neuralgia, ionotherapy has a prominent place, and thus iontophoresis should be used more widely than it is at present. The effective ions in such cases are aconite ions, salicyl ions and calcium ions."

HAY FEVER

A. P. Cawadias, O.B.E., M.D., F.R.C.P. In the Brit. Jour. of Phys. Med. says, "Professor Demetriades (now of Athens) working at the Laryngological Clinic at Munich, wrote in 1927 of treatment of vasomotor disturbances of the nose by iontophoresis, and thus about the treatment of hay fever. The method was immensely taken up in America and in this country. Philip Franklin has done much to develop the technique and indications. It is applied currently in various London hospitals. Since the first paper of Demetriades all those who have used this method have reported good results."

COLLE'S FRACTURE

Frederick H. Morse, M. D...."The deformity following Colle's fracture usually calls for passive exercises and forcible manipulation of the part to prevent fixed adhesions. The average patient will not do this himself nor allow it to be done by others to make it effective. To get around this difficulty and accomplish the desired result, apply a unidirectional galvanic surging current...it will prove effective...A patient will usually tolerate this mechanical manipulation better than the manual."

THERAPEUTICS IN CHIROPODY

Alvah M. Stafford, M. D., N.Y.C., author of "Handbook of Physiotherapy" written especially for chiropodists, says."Morton's Neuralgia, in which there are well defined reflex symptoms as a result of mechanical pressure, especially in those of neurotic temperament, is frequently benefited by the use of positive galvanism. Acute neuritis, especially that localized, as in plantar neuritis, at times requires positive galvanism...The fibrositic changes in chronic neuritis call for the softening action of negative galvanism. Chronic Bursitis...offers a field for negative galvanic ionization of iodine...The softening action of the cathode combined with the alterative effect of the iodine upon the superficial fibrosity is bound to result in its absorption. Pernio (chilblain and frostbite) and Trench foot where the vessels are fibrosed, are well treated with negative galvanism."

TREATMENT OF PARALYSIS

R. Kovacs, M. D.(In "Electrotherapy and Light Therapy")..."It has been established by both clinical and experimental evidence that the slow sinusoidal current furnished a stimulus of long duration and slowly surging quality. Smooth muscles and skeletal muscles in the stage of flaccid paralysis respond to such a stimulus while they cannot be stimulated by the normal quick forms of electrical stimulation.

"The slow sinusoidal current is, therefore, the main standby in the treatment of paralysis with the involvement of the lower motor neuron, such as peripheral nerve injuries and infantile paralysis, in the stage when there is no voluntary power of contraction and no response to the faradic type of stimulation. For exercising weak muscles without organic nerve involvement this current is not so pleasantly tolerated and not so effective as the surging currents of more rapid frequency.

SCIATIC NEURITIS

R. Kovacs, M. D. (In Electrotherapy and Light Therapy")..."In chronic cases of sciatic neuritis the characteristic symptoms are dull aching and paresthesia instead of the continuous sharp pain in acute form and possibly also atrophy and weakness of the leg muscles. These symptoms are the result of a true fibrositis, degenerative processes in the nerve and adhesions and pressure in its sheath... the interrupted sinusoidal applied with either the longitudinal method or with the individual motor point technique will exercise muscles and assist in breaking up adhesions."

INFANTILE PARALYSIS

Charles L. Ireland, M. D. Anterior Poliomyelitis -- "These cases are usually referred to the physical therapist after all acute symptoms have subsided and about everything but electricity has been tried...After all acute symptoms have subsided, (usually from 60 to 90 days) sinusoidal treatments may be started...Use the slow galvanic sinusoidal current for its nutritional value."

INSOMNIA

Charles L. Ireland, M. D...."Generally due to mental worries which exhaust the splanchic nerves allowing venous blood to gravitate more or less into the abdominal veins, causing a slight splanchic hyperemia with the resultant cerebral anemia. Some very nice results in such cases have been obtained. (with superimposed wave current)."

THERAPEUTIC APPLICATIONS OF THE SINUSOIDAL CURRENTS IN CHIROPODY

Alvah M. Stafford, M. D., in "A Handbook of Physiotherapy" --"Weak foot and flat foot -- It is in these attitudes of deformity that the slow sinusoidal current is especially indicated in the practice of chiropody. In incipient weak-foot, the muscles of the leg and foot which have become relaxed and tired from over-use and faulty attitudes are refreshed by the vibratory impulse of the rapid or interrupted rapid sinusoidal current."

CONSERVATIVE METHOD OF TREATMENT OF TRIGEMINAL NEURALGIA

Benjamin Ulansky, M. D., Phila., Pa. (Am. Congress Phys. T., N.Y.C., 9-11-36)... "The intractable character of tic douloureaux and the great number of therapeutic measures devised for its relief, few of which have survived any prolonged use, justify the earnest consideration of any additional measures that may be proposed from time to time for its amelioration. For the past ten years we have been using a certain form of electricity (rapid sinusoidal) for the relief of pain in various nerve affections. Favorable results obtained in sciatica and other forms of neuritis and neuralgia have suggested its application also for trigeminal neuralgia of both major and minor forms. Sixty-five cases have been treated with only nine failures...the majority were referred by the Neurological and Surgical Departments of the Jefferson Hospital (Philadelphia, Pa.)".

G. Betton Massey, M. D. (Fellow and Former Pres. American Electrotherapeutic Assn) and Frederick H. Morse, M. D. (Fellow and Former Pres. Am. Electrotherapeutic As.) in their book "Galvanic Currents and Low-Voltage Wave Currents in Physical Therapy" say..."The Wave Current Principle... is being recognized as a wonderful help in physical therapeutics, and the prime object of the sine current is to enhance the value of the different electric currents with which we have been familiar."

STRICTURE OF BRONCHIAL TUBE (SPASMODIC)

Charles L. Ireland, M. D...."with patient lying on back, turn on superimposed or surging rapid sinusoidal current...A very few treatments should give results unless the stricture is cicatricial tissue, when of course the sinusoidal current will be of no use and galvanism should be used."

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4738	5.00
4739	5.00
4740	5.00
4741	5.00
4742	9.00
3668	2.50

PAGE 58

Prices Shown in Catalog

PAGE 59

3429	$ 15.00
3430	20.00
3408	6.00
3426	20.00
3409	10.00
3410	10.00
3411	3.00
3432	12.00
3431	10.00
3413	12.00
3414	5.00
3415	4.00
3416	1.50
3417	5.50
2317	7.00
3418	5.00
2318	5.00
3419	5.50
3420	14.00
2319	2.00
2321	10.00
3421	10.00
3422	6.00
3428	3.00
3427	20.00
2325	10.00
3434	10.00
3436	5.00
2770	9.00
2769	10.00
2767	2.00
2766	4.50
3406	15.00
2352	6.50
2353	3.00
2764	5.50

See Other Side For Balance Of Prices

Prices subject to change without notice.

Form 2001A

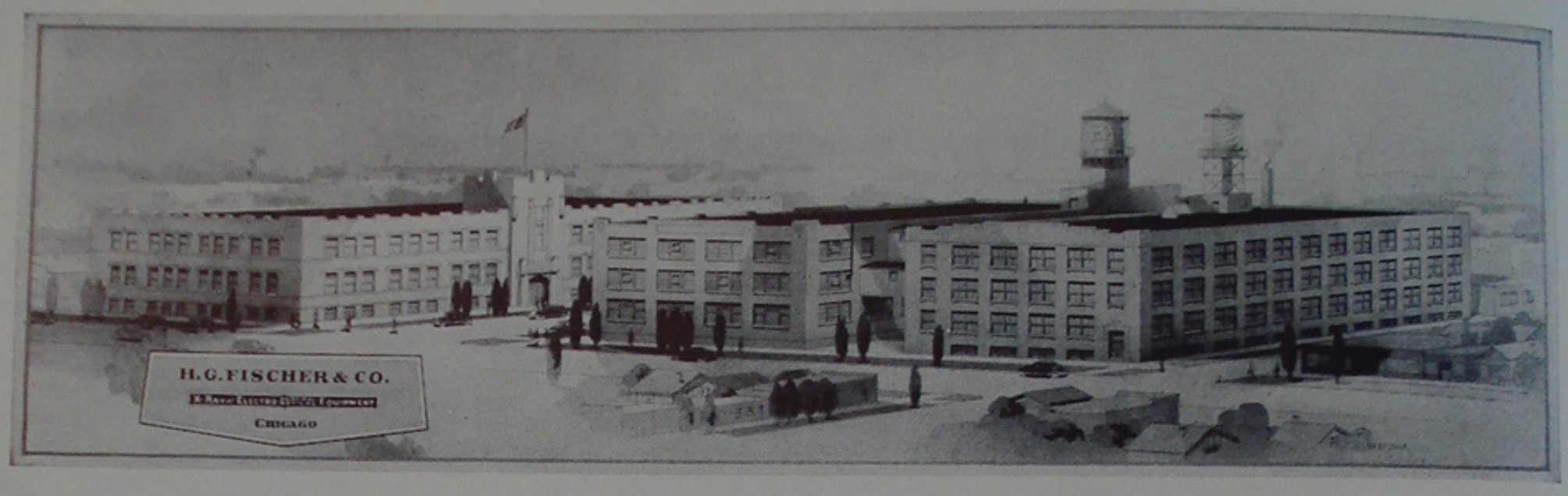
FISCHER X-RAY APPARATUS ACCESSORIES and SUPPLIES

ELECTRO-SURGICAL-MEDICAL APPARATUS

1941-1942 : Catalog No. 38

H. G. FISCHER & CO.

2323-2345 Wabansia Avenue . . Chicago, Illinois



Home of H. G. FISCHER & CO., 2323-2345 Wabansia Ave., CHICAGO, ILLINOIS

The Complete FISCHER Line

The complete FISCHER Line includes many models of shockproof X-Ray Apparatus (Medical and Dental), Short Wave Units, Galvanic and Contractile Currents Generators, Ultra Violet and Infra-red Generators, other Apparatus, Supplies and Accessories. The FISCHER manufacturing policy requires first that every piece of FISCHER equipment shall equal or exceed in performance every competing unit designed for the same purpose, regardless of price. Second, the unit itself must be priced at the lowest point consistent with quality manufacture.

Organized in 1910, H. G. FISCHER & CO. have become one of the largest manufacturers of x-ray and electro-surgical-medical apparatus. Their equipment is known today and used the world around. It is a fact worth noting that this company was founded so long ago with small capital, and has been built up to its present proportions without the introduction of outside capital, never undertaking any mergers or reorganizations. We believe this is the only company in the industry where the men who founded it have always been and still are the active heads—where the original ideals of building the most efficient, durable and result-producing equipment possible and selling it at a fair price have been continued throughout the company's history with the same continuity of ownership, management and personnel.

The fact that more than 65,000 physicians, dentists, hospitals, clinics and universities in the United States use FISCHER manufactured equipment and that virtually all of these over this period have purchased additional FISCHER equipment is evidence that this apparatus can be thoroughly relied upon. FISCHER apparatus is well and favorably known around the world.

Further, the fact that H. G. FISCHER & CO. distributes its products through factory-trained dealer representatives not only enables the purchaser to get a great deal more per dollar expended by way of efficient and durable equipment, but at the same time assures to him an extraordinary high quality of service from expert men. Our comparatively small overhead expense and direct factory representation enable us to give the purchaser such value per dollar expended as cannot be excelled by any competitor in the field.

The FISCHER plant is centrally located. Physicians and dentists visiting Chicago are invited to spend as much time as they desire inspecting our newest apparatus or consulting regarding the technics of operation and application. Factory visitors are not solicited for orders. When wanting information, ask your local FISCHER dealer representative or write to our Home Office in Chicago.

FOREWORD

In presenting this 38th Edition of the H. G. FISCHER & CO. Catalog of X-Ray Apparatus, Electro-Surgical-Medical Apparatus, Accessories and Supplies, it is pertinent to note:

. . . **1** That every effort has been made to include all items needed by the x-ray specialist, medical or dental.

. . . **2** That many competing items are shown, such as screens and films, permitting selections to be made.

. . . **3** That prices have been inserted for the convenience of customers.

. . . **4** And that a handy reference index will be found at the back of the catalog.

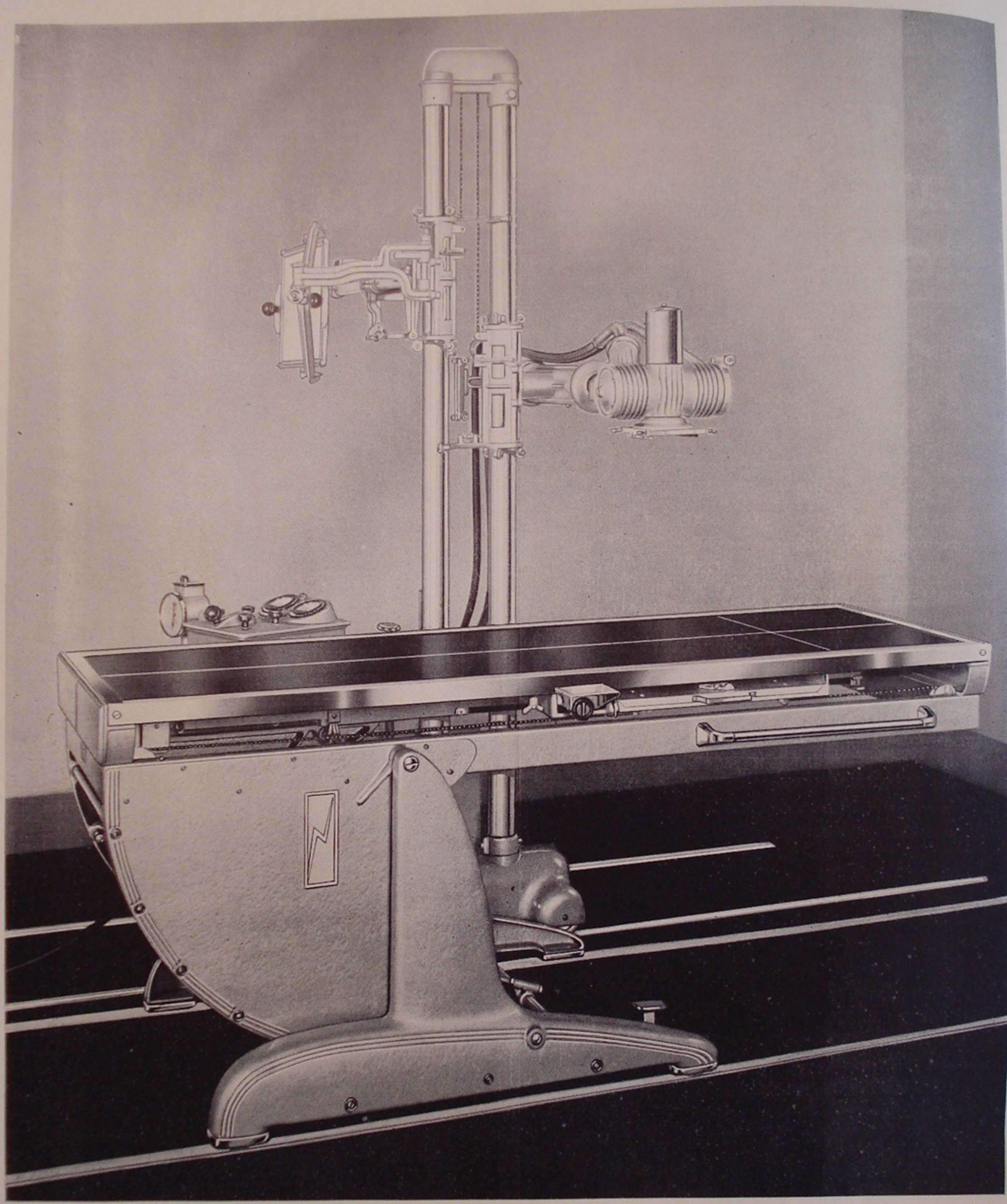
Every piece of apparatus, also all accessories and supplies listed are recommended as highest quality and wholly dependable. It is to be understood, further, that illustrations and descriptions are not binding as to detail, in view of the fact that improvements are constantly being sought and, when found, adopted by the manufacturers.

Orders will always be filled with "the latest model" equipment, accessories, or supplies—new models naturally being superior to the models replaced.

Inquiries for items not catalogued are invited.

NOTICE

Prices quoted are F.O.B. Chicago, and subject to change without notice. H. G. FISCHER & CO. makes every effort to give prompt and efficient service. Read page 60 for Instructions on How to Order.



FISCHER MODEL "RF-100"
Shockproof X-Ray Apparatus

FISCHER Model "RF-100" Shockproof X-Ray Apparatus has proved itself extremely popular with many physicians, hospitals, clinics, and other medical institutions wanting very fine performance in both radiography and fluoroscopy, coupled with reasonable price. This apparatus, as shown by the illustrations, can readily be

adjusted for any radiographic or fluoroscopic need. All positions lock fast.

Among special features, is the double-focus tube, 350,000 heat unit capacity; the Patterson Type "B" screen; the FISCHER Tilt Table; the FISCHER Electrosynchrotimer. When desired a special timer will be provided, calibrated to one-twentieth second. Both x-ray apparatus and table are mounted on rails, permitting installation of this apparatus in surprisingly small space.

●

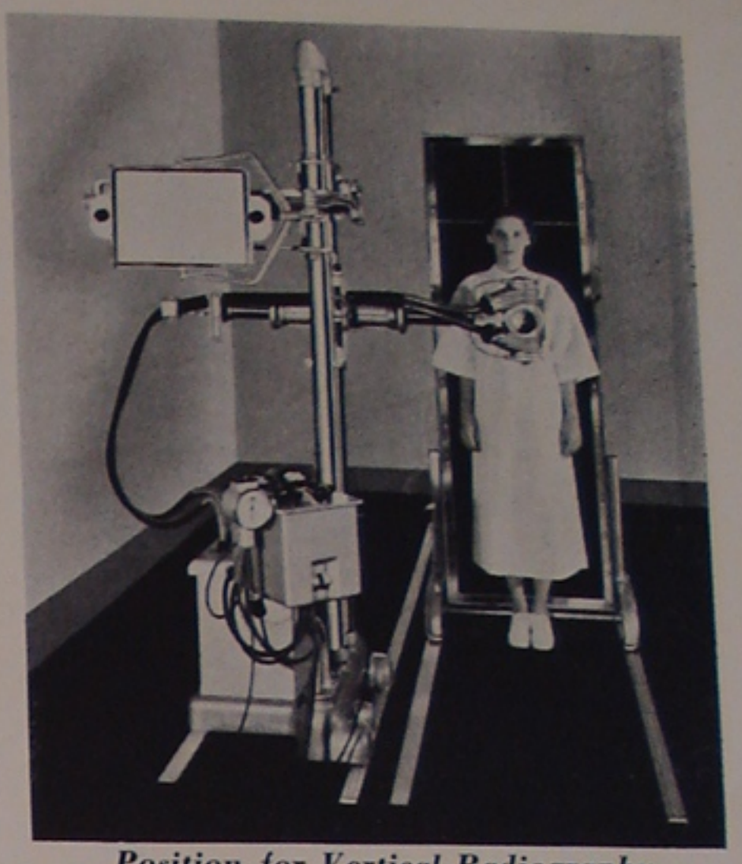
Features of STRUCTURE-OPERATION

1. This apparatus is shockproof throughout—grounding wire in line cable.
2. Power is up to 100 M.A. and up to 100 P.K.V. Both milliamperage and kilovoltage are variable.
3. Control is fine—there are main and auxiliary controls for M.A. and for P.K.V. Milliamperage is continuous, kilovoltage may be varied as little as one P.K.V.
4. Flexibility is a special feature—all required adjustments are easily and quickly made.
5. The double-focus tube provides a fine focus (1.5 mm.) and a broad focus (4.8 mm.) with selector switch on control stand. A heat indicator is built into the tubehead.
6. The screen is Patterson Type "B"—12"x16". Shutters provided with convenient controls.
7. The FISCHER Electrosynchrotimer measures time in 1/10 sec., maximum 15 seconds. A special timer, calibrated to 1/20 sec., maximum, 20 seconds, is available.
8. The FISCHER Tilt Table is full size, locks in any required position. Equipped with FISCHER Synchrotimed Bucky diaphragm.
9. The high voltage transformer provides stable operation at high efficiency under all load conditions.
10. A safety circuit breaker protects against overload.
11. The finish is black kristokrak or hammered gray. Special finishes at slight additional cost.
12. This apparatus is backed by the usual strong FISCHER guarantee.

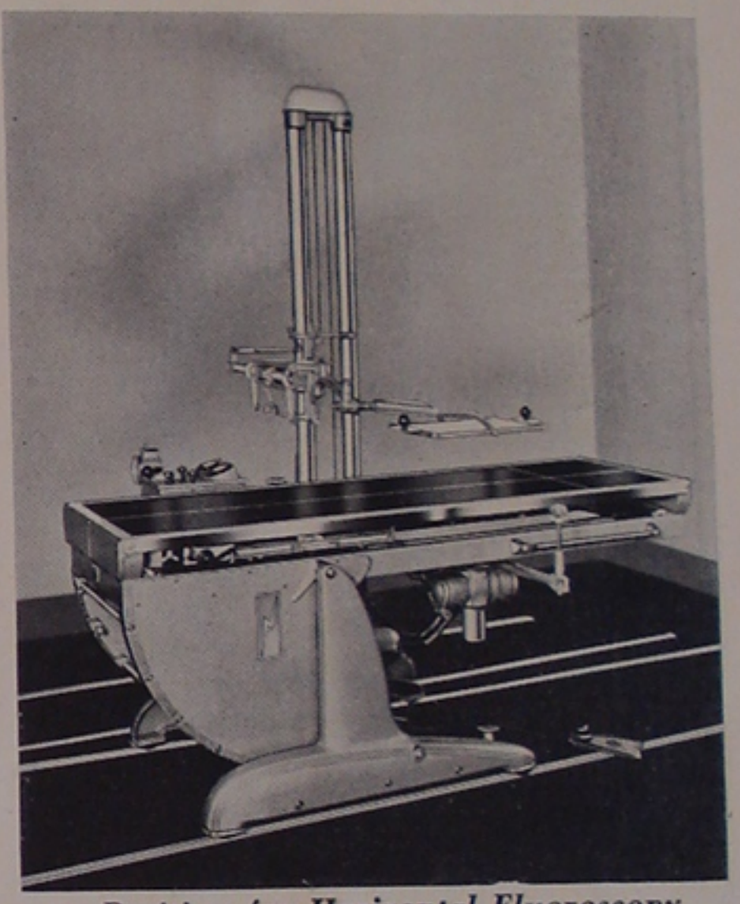
●

No.		Code
4604	**FISCHER Model "RF-100" Shockproof X-Ray Apparatus, including tube, screen, controls, Synchrotimer, table and 17" Bucky, foot switch, shutters, and mounted on rails**	TIOSC

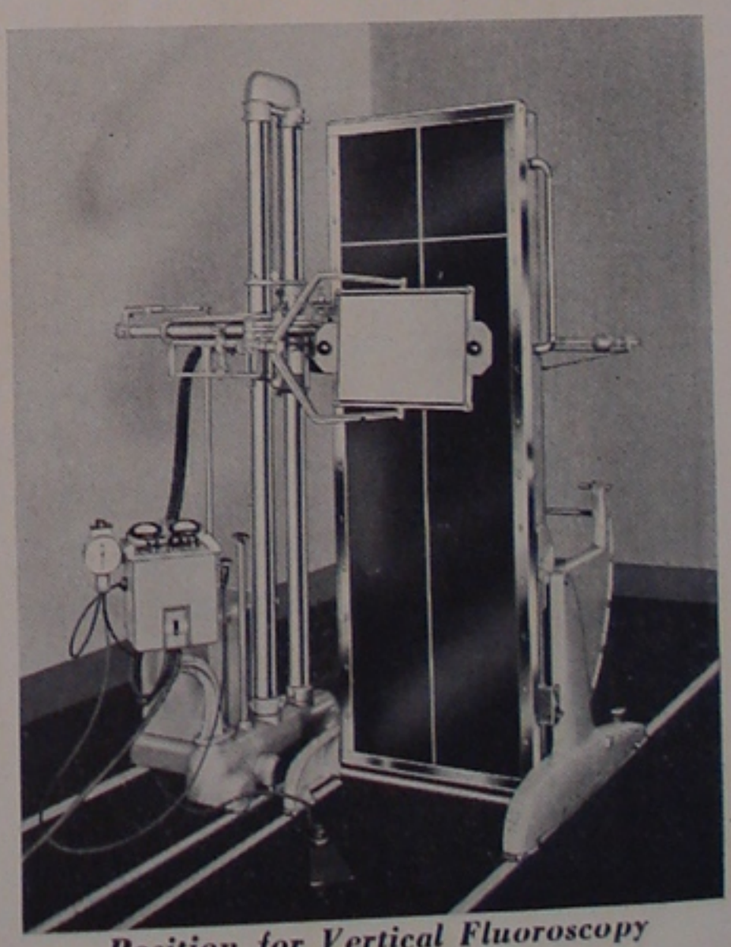
Ask for descriptive pamphlet Form 2002



Position for Vertical Radiography



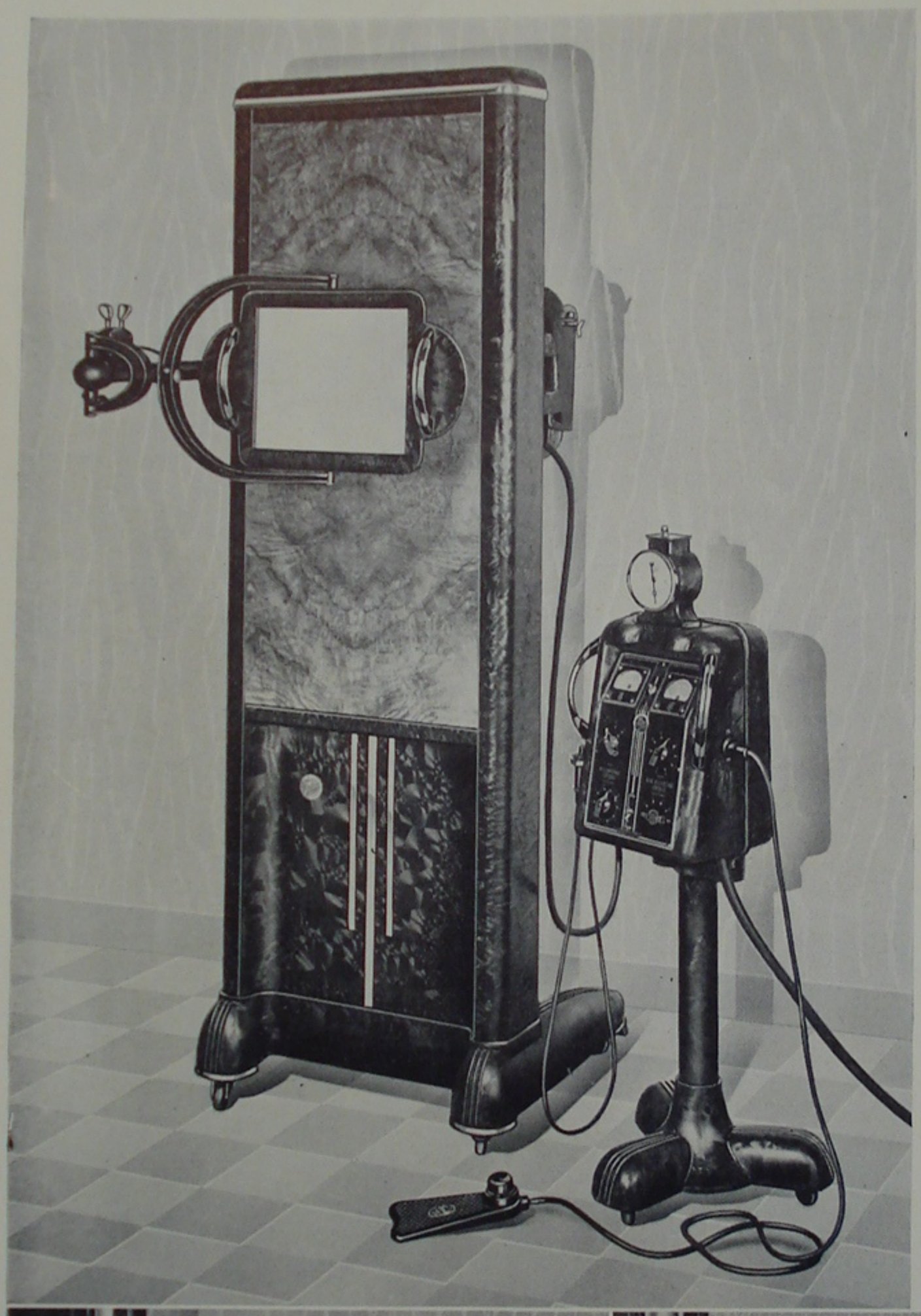
Position for Horizontal Fluoroscopy



Position for Vertical Fluoroscopy

FISCHER MODEL "TF"

Shockproof Fluoroscope with Radiographic Facilities



FISCHER Model "TF" provides a double-service. It is first of all a highest-quality vertical fluoroscope. This unit is shown in the adjoining illustration. Second, used with a table, this apparatus affords a surprisingly wide range of radiographic performance. The tubehead swings out over the table, as shown on opposite page, swivels to any angle, and may be positioned for use with wall frame or wall-mounted cassette holder.

Power is up to 30 M.A. and up to 96 P.K.V., both milliamperage and kilovoltage being under exceptionally fine control. Among features worthy of special mention are the leak-proof housing for tube and transformer (made of a single piece of cold drawn steel), the convenient shutter controls, mounted in the screen carriage arm, and the heavy, adjustable shutters providing any limitation of screen area. Note the three small illustrations below. FISCHER Model "TF" permits use of the FISCHER Orthodiagraphic Attachment.

This apparatus, as a mobile vertical fluoroscope or in arrangement with x-ray table, is recommended to physicians, hospitals, clinics, and other medical institutions desiring finest performance in apparatus of this power. It is backed by the usual strong FISCHER guarantee.









CONTROL MECHANISM

FISCHER Model "TF" operates under especially fine controls. The stand is mobile for convenience. The line switch is also a circuit breaker. There are main and auxiliary controls for both milliamperage and kilovoltage. Milliamperage control is continuous from 0 to 30. Kilovoltage may be varied as little as approximately one P.K.V. Two pilot lights, with ON and OFF switch, serve also as meter lights. A hand switch for radiography is included. All markings are clear and legible and will remain so permanently.



Features of STRUCTURE-OPERATION

1. FISCHER Model "TF" is shockproof throughout. Tube and transformer are immersed in oil.
2. The tube is of the durable, heavy-anode type. A choice of a 2 mm. or of a 3.2 mm. focal spot is available.
3. The screen is the Patterson Type "B". Furnished in 10"x12" size or in 12"x16" size.
4. The shutter controls are conveniently located and may be operated, singly or together, with gloved hand.
5. The high voltage transformer provides stable operation at high efficiency under all load conditions.
6. The FISCHER Electrosynchrotimer measures time in 1/10 seconds, maximum 15 seconds.
7. The fluoroscopic panel is specially selected to be free from fluoroscopic grain. Screen moves readily over any part of panel.
8. In both materials and construction, FISCHER Model "TF" is highest quality.
9. Standard finishes are black kristokrak or hammered gray. Ivory at slight additional cost.
10. FISCHER Model "TF" will operate on either a 220 volt line or a 110 volt line of adequate capacity—A.C. Orders must specify line voltage and cycle.

No.		Code
4585—	FISCHER Model "TF" Shockproof Fluoroscope with Radiographic Facilities, including 10"x12" Patterson Type "B" screen, Remote Control Unit and cables, Electrosynchrotimer, Foot Switch, 2 mm. focal spot X-Ray Tube with casters and locks	TIHHT
4586—	Same as Cat. No. 4585 except has 3.2 mm. focal spot x-ray tube	TIJEX
4591—	Same as Cat. No. 4585 except equipped with 12"x16" Patterson Type "B" screen in place of the 10"x12" size	TIJIT
4592—	Same as Cat. No. 4586 except equipped with 12"x16" Patterson Type "B" screen in place of the 10"x12" size	TIJJS
4595—	Set of 4 Special Wheels and two 9' Guide Rails	TIJLP

Ask for descriptive pamphlet Form 1915A

FISCHER MODEL "TC"
Shockproof X-Ray Apparatus

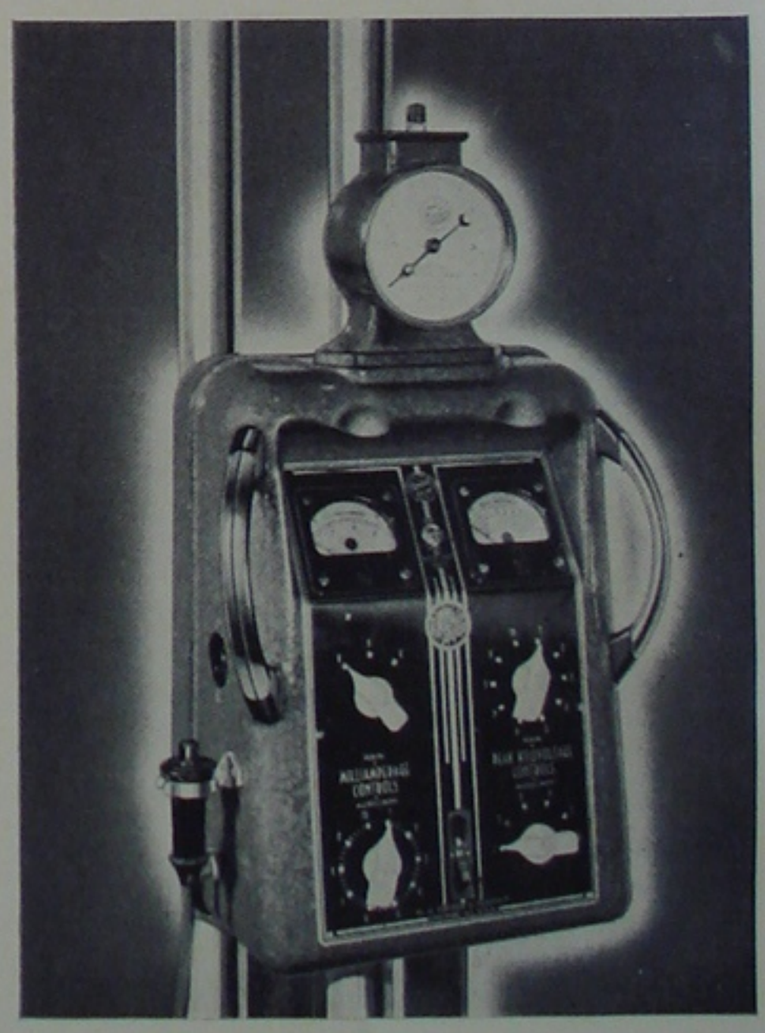


IN this FISCHER Model "TC" is embodied two outstanding features—ease and simplicity of operation and highly efficient performance. Used with a table (wall frame or wall-mounted cassette holder), this unit affords both vertical and horizontal radiography, and fluoroscopy is available using a hand or operating fluoroscope or suspended screen. All materials are highest quality.

Among features worthy of special mention are the following: Power is up to 30 M.A. and up to 96 P.K.V. Control is very fine, milliamperage is continuous from 0 to 30 and kilovoltage may be varied as little as approximately one P.K.V. Flexibility is complete, the tubehead may be placed easily in any required position above or below table. A choice of x-ray tubes is permitted—either a 2 mm. focus for bone definition or a 3.2 mm. focus for heavy work. Any physician, roentgenologist, hospital or clinic, wanting a mobile x-ray unit of this power, will find this FISCHER Model "TC" satisfactory in every way. Performance is backed by the usual strong FISCHER guarantee.

Features of STRUCTURE-OPERATION

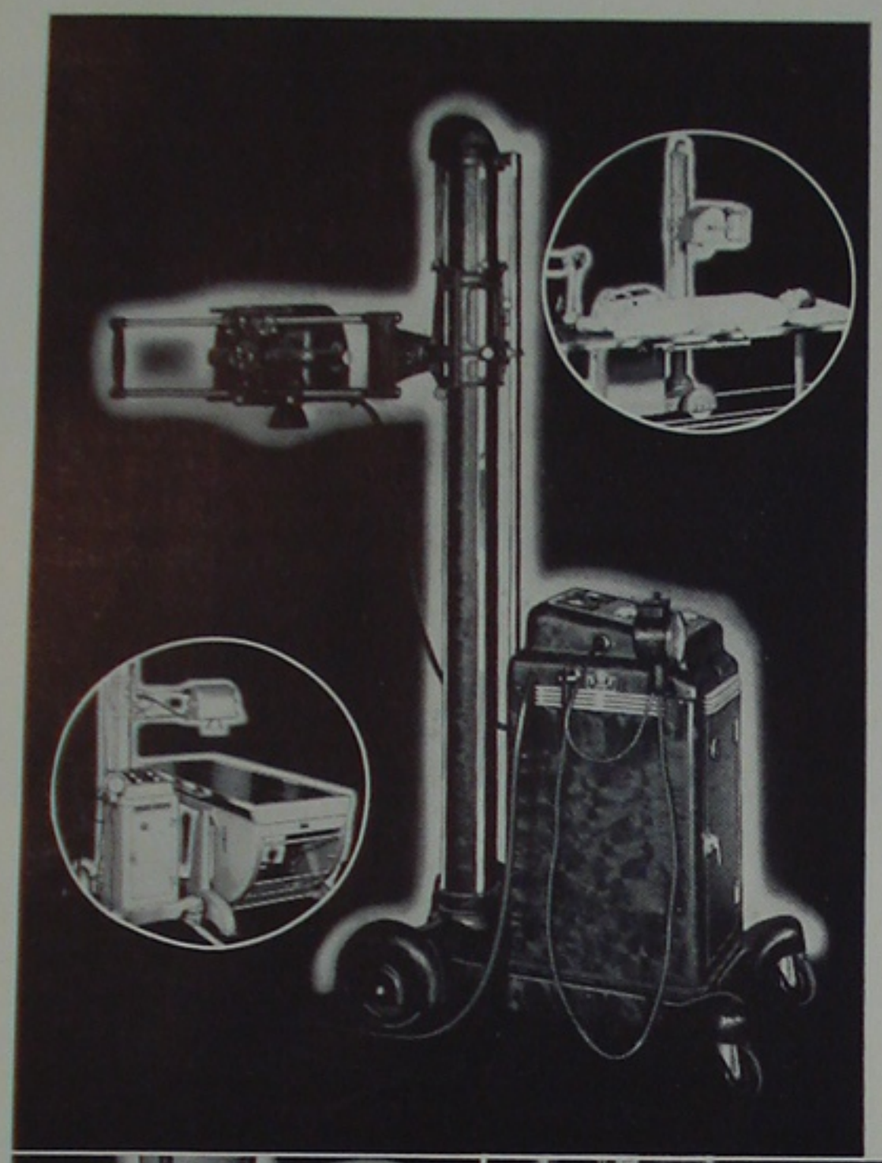
1. SHOCKPROOF. FISCHER Model "TC" is shockproof throughout. Grounding wire in line cord.
2. X-RAY TUBE. This is of the durable, heavy-anode type, constructed to give exceptional definition in both radiography and fluoroscopy. A choice of a 2 mm or a 3.2 mm focal spot is available.
3. HIGH VOLTAGE TRANSFORMER. Contained in the oil-immersed tubehead. Provides stable operation at high efficiency under all load conditions.
4. TIMER. FISCHER Model "TC" is equipped with the FISCHER Synchrotimer, measuring time in 1/10 sec., maximum, 15 sec.
5. ADJUSTMENT MECHANISM. For raising and lowering tubehead. Operation very easy. Automatic lock prevents accidental dropping of tubehead.
6. CIRCUIT BREAKER. Provides utmost safety against electrical overloads and damage to apparatus.
7. CURRENT. FISCHER Model "TC" will operate on either a 220 volt line or a 110 volt line of adequate capacity—A.C. Orders must specify line voltage and cycle.
8. CONSTRUCTION QUALITY. In both materials and construction, FISCHER Model "TC" is highest quality. Breakdowns and the need of repairs are extremely unlikely.
9. FINISHES. Standard finishes are green hammerloid or hammered gray. Black kristokrak or ivory will be furnished on order.



No.		Code
4540	**FISCHER Model "TC" Shockproof X-Ray Apparatus—2 mm focal spot**	TIGRH
4544	**FISCHER Model "TC" Shockproof X-Ray Apparatus—3.2 mm focal spot**	TIHDX

Ask for descriptive pamphlet Form 1915A

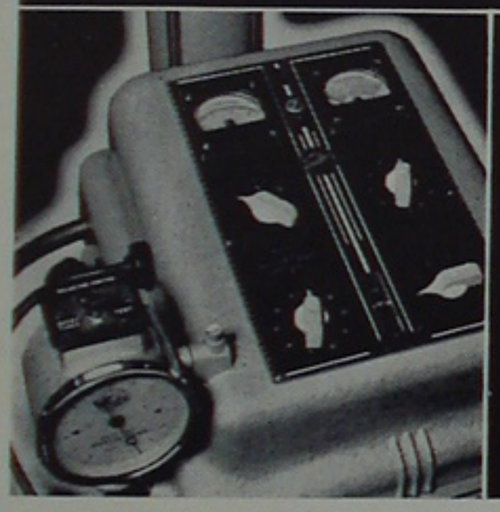
FISCHER MODEL "TM"
Shockproof X-Ray Apparatus

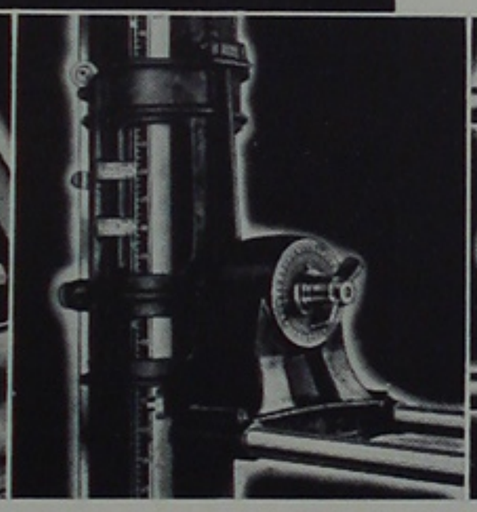


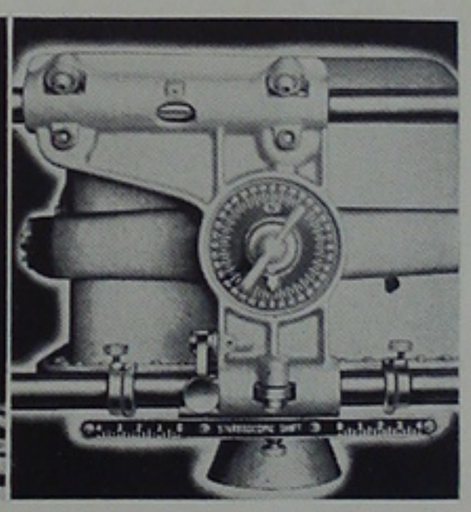
THIS remarkably flexible apparatus is available either as a mobile unit mounted on wheels and casters, or as a unit mounted on grooved rails for use with table. Complete radiographic and fluoroscopic service is available, the latter using a hand or operating fluoroscope or suspended screen. The power available is up to 30 M.A. and up to 96 P.K.V. Operators can depend on exact energy output at any control setting.

Other features worthy of special emphasis are the following: The unit is shockproof throughout. Every required position in radiography and fluoroscopy is very easily obtained and locks fast. There is a vertical scale indicating the exact distance of x-ray tube above table and above Bucky diaphragm. The stereoscopic shift is calibrated to allow accurate selection of all stereoscopic distances. The x-ray tube and transformer are oil-immersed within a leak-proof housing made of one single piece of cold-drawn steel.

Below is given a list of other features of structure-operation. Performance of this apparatus is backed by the usual strong FISCHER guarantee.







ILLUSTRATIONS

Illustration above shows FISCHER Model "TM" as mobile unit. Insets show how unit may be used with x-ray tables of different types. The three small illustrations show the control mechanism, the vertical scale, and the stereoscopic shift. In place of the FISCHER Electrosynchrotimer shown, this apparatus may be equipped with a best-quality hand timer.

Features of STRUCTURE-OPERATION

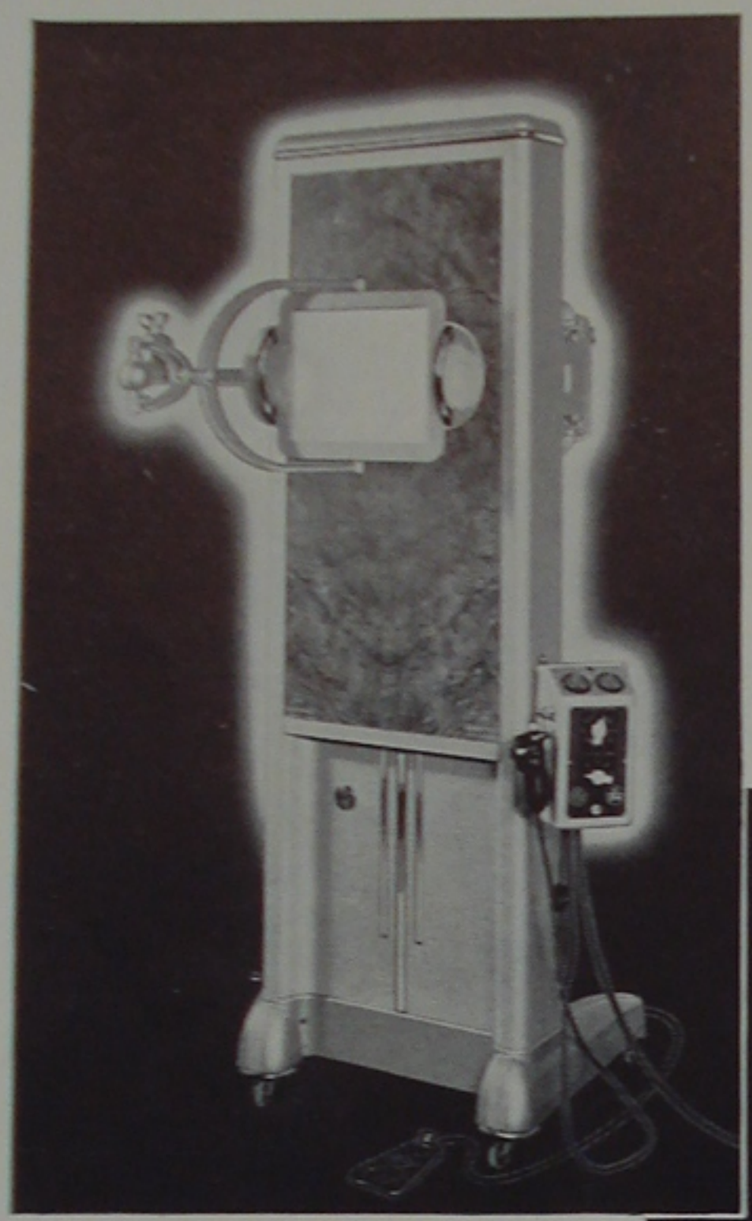
1. FISCHER Model "TM" is exceedingly compact. Even with table, small installation space is needed.
2. Both M.A. and P.K.V. are variable and under especially fine control, permitting the exact penetration needed. Milliamperage is infinite from 0 to 30; kilovoltage may be varied approximately one P.K.V. at will. Main and auxiliary controls are provided.
3. The x-ray tube is of the durable, heavy-anode, fine-focus type. Constructed to give exceptional definition in both radiography and fluoroscopy.
4. The counterbalance is hidden within the upright and is exact. A slight push or pull raises or lowers tubehead. Supported by double chain, insuring safety.
5. Locks permit locking machine and tubehead fast in any required position.
6. A circuit breaker provides the utmost safety against electrical overloads and damage to apparatus. Operated quickly, easily and safely.
7. A double-compartment, lead-lined cabinet provides space for storing films and cassettes.
8. FISCHER Model "TM" will operate on either a 110 volt or 220 volt line—A.C. Orders must specify current.
9. In both materials and construction, FISCHER Model "TM" is highest quality.
10. Standard finishes are hammered gray, black kristokrak and plain ivory.

No.		Code
4490	**FISCHER Model "TM" Shockproof X-Ray Apparatus including Synchrotimer and mounted on free-rolling wheels and casters**	TIESG
4491	**FISCHER Model "TM" Shockproof X-Ray Apparatus including Synchrotimer, also mountings for and set of 9′ grooved rails**	TIETE

Ask for descriptive pamphlet Form 1895

FISCHER MODEL "GF"

Shockproof Fluoroscopic and Radiographic Apparatus



IN designing FISCHER Model "GF" Fluoroscopic and Radiographic Apparatus, the purpose was first, to provide a highest-quality vertical fluoroscope; second, to add, within the power range, virtually every service needed in both vertical and horizontal radiography. At the same time, the price of this double-purpose apparatus is remarkably low.

The illustrations given herewith show FISCHER Model "GF" both as the vertical fluoroscope (left) and in arrangement with table (below). Note optional mounting on rails. These units are equipped with the standard control mechanism. The small illustration at bottom shows FISCHER Model "GF" arranged with the FISCHER mobile remote control and FISCHER Electrosynchrotimer. This unit permits use of the FISCHER Orthodiagraphic Attachment for heart tracing. FISCHER Model "GF" is recommended to physicians, hospitals, clinics and other medical institutions desiring highest quality performance. It is backed by the usual strong FISCHER guarantee.



CONTROL MECHANISM

FISCHER Model "GF-15" Fluoroscopic and Radiographic Apparatus is equipped with the standard control mechanism shown attached to frame. Note the milliamperage and kilovoltage controls, the separate meters and the hand timer. There is a pilot light. The filament control is continuous from 0 to 15. The kilovoltage control provides five voltage steps from 33,000 to 85,000 volts.

Where still finer control is desired, the FISCHER mobile, remote control stand is recommended. This stand provides finer kilovoltage control and is equipped with the FISCHER Electro-synchrotimer, measuring time in 1/10 second; maximum, 15 seconds.

Features of STRUCTURE-OPERATION

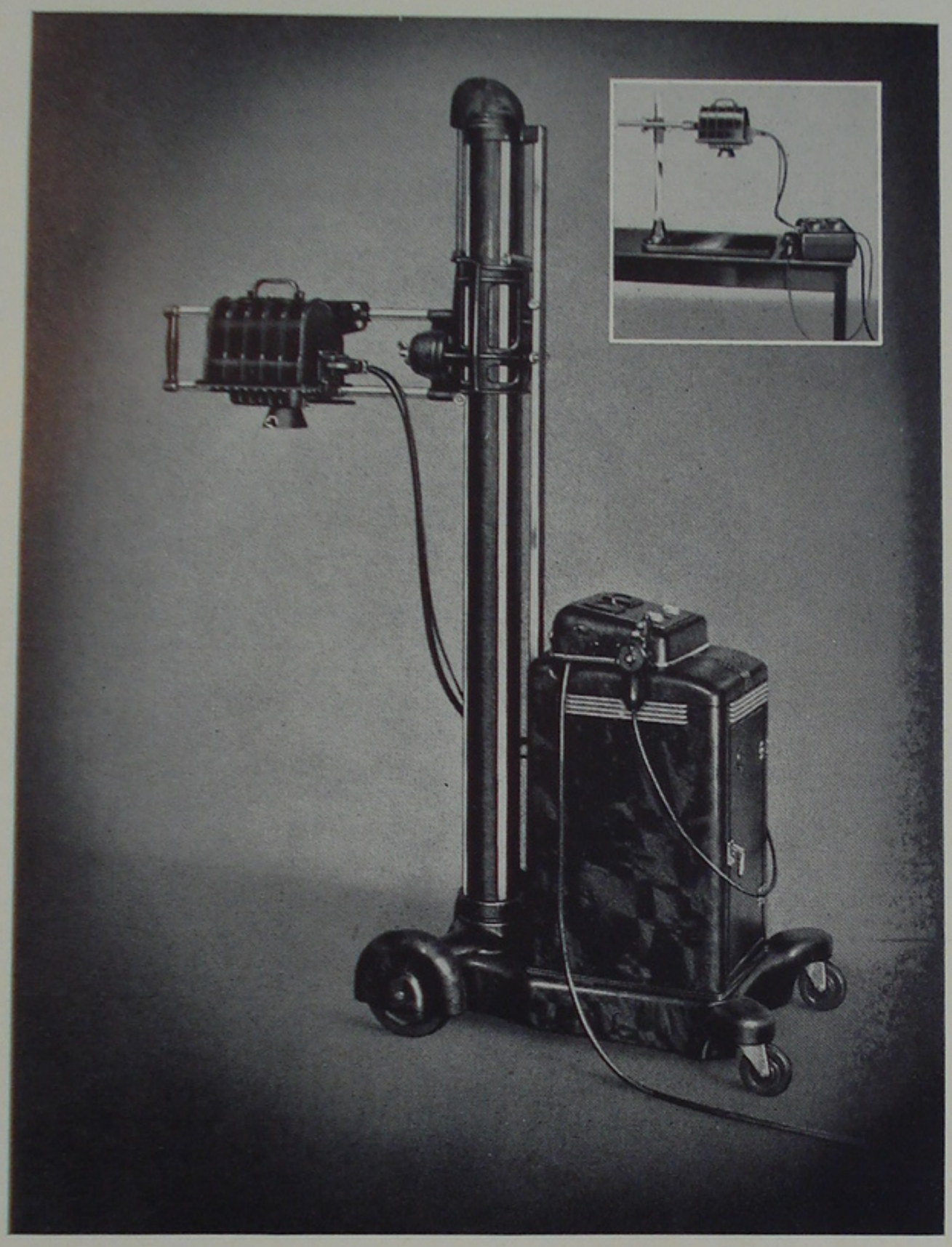


1. FISCHER Model "GF" is shockproof throughout. Tube and transformer immersed in oil.
2. Power available is up to 15 M.A. and up to 85 P.K.V. Output exact at any control setting.
3. The x-ray tube is of the durable, heavy-anode, fine focus type, giving exceptional definition in both radiography and fluoroscopy.
4. The screen is the Patterson Type "B", either size 10"x12" or 12"x16".
5. A choice of timers is available—a best quality hand timer or the FISCHER Electrosynchrotimer on remote control stand.
6. Standard finishes are black kristokrak or hammered gray. Special finishes at slight additional cost.

No.		Code
4610	FISCHER Model "GF" Shockproof Fluoroscopic and Radiographic Apparatus, including standard control mechanism, hand timer, foot switch, 10"x12" Patterson Type "B" screen, cone, with double casters and locks	TIKJS
4595	Set of 4 grooved rollers and 9 ft. double guide rails	TIJLP
4612	Same equipment as listed under No. 4610 but with 12"x16" screen in place of the 10"x12"	TIKKR
4614	FISCHER Model "GF" Shockproof Fluoroscopic and Radiographic Apparatus, same as No. 4610 except equipped with Remote Control Unit No. 4352A and Electrosynchrotimer in place of standard control mechanism and hand timer	TIKLP
4616	Same equipment as listed under No. 4614 but with 12"x16" screen in place of the 10"x12"	TIKMO

Ask for descriptive pamphlet Form 1933

FISCHER MODEL "GM"
Shockproof X-Ray Apparatus



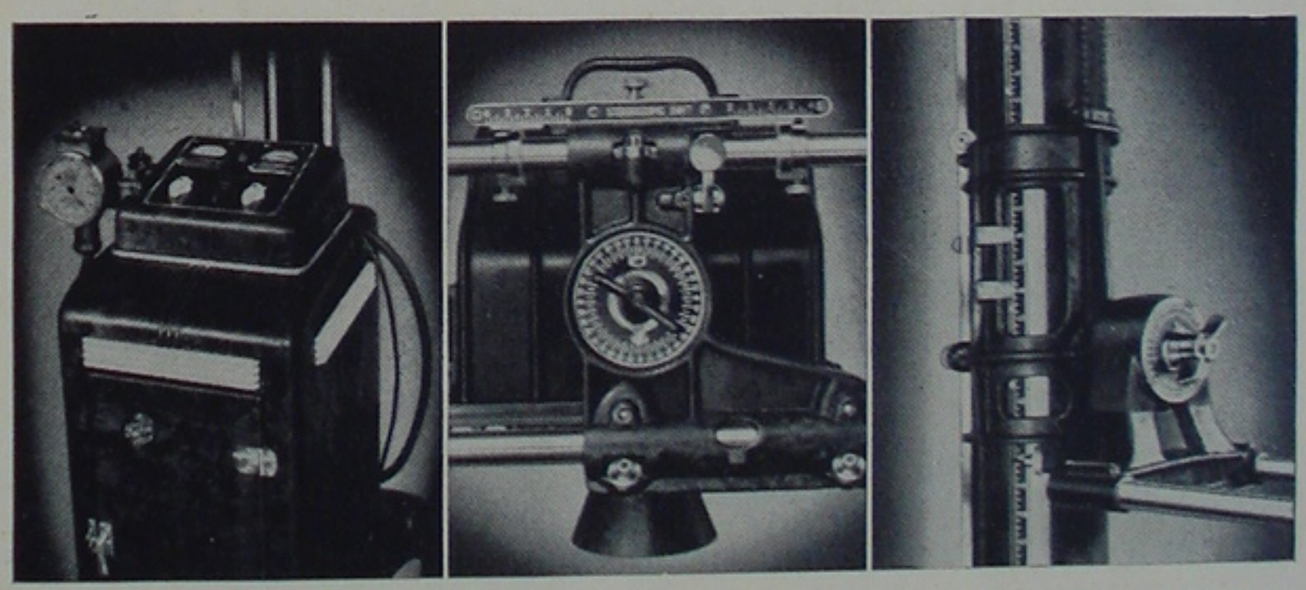
Available as mobile unit shown or as unit arranged to mount on set of grooved rails.

THIS FISCHER Model "GM" Shockproof X-Ray Apparatus is recommended to physicians, hospitals, clinics, either as an original installation or as a mobile unit supplementary to a large fixed installation. Designed primarily for radiography, fluoroscopy is also possible with hand or operating fluoroscope or suspended screen. A noteworthy feature is the fine portable radiographic unit made by removing tubehead and control box and using a tablestand (note inset). Power available is up to 15 M.A. and up to 85 P.K.V. Performance is excellent. At 10 M.A. and 45 P.K.V., with high speed screens, a wrist or elbow requires only 1 sec. At 15 M.A. and 65 P.K.V., a P.A. chest requires only ½ sec. Fluoroscopic results are equally satisfactory.

The small illustrations below show various features of construction—the control stand, the stereoscopic shift, the vertical scale. Every electrical and mechanical feature of proven value has been built into this apparatus. Following are listed the more important features of construction and operation.

FEATURES

1. FISCHER Model "GM" is shockproof throughout. Construction is of the oil-immersed type.
2. The design permits complete flexibility of tubehead—tubehead can be lowered under table.
3. Control is very fine. Both milliamperage and kilovoltage are variable.
4. The latest-type, fine-focus tube is used—designed to give exceptional definition in both radiography and fluoroscopy.
5. The high voltage transformer provides stable operation at high efficiency under all load conditions.



6. There is a double-compartment lead-lined cabinet for films.
7. Finishes are black kristokrak or hammered gray. Special finishes at slight extra cost.

No.		Code
4470A	**FISCHER Model "GM" Mobile Shockproof X-Ray Apparatus, on casters with hand timer**	TIEAZ
4471A	**FISCHER Model "GM" Mobile Shockproof X-Ray Apparatus with hand timer and arranged to mount on set of 8′ grooved rails**	TIECX

FISCHER Synchrotimer furnished at small additional charge.

Ask for descriptive pamphlet, Form 1836A.



FISCHER Model "GA-15" Shockproof X-Ray Apparatus

THIS is an all-service unit, usable with table (wall frame or wall-mounted cassette holder) when desired. Both vertical and horizontal radiography are possible. Fluoroscopy is possible, using a hand or operating fluoroscope or suspended screen. Power is up to 15 M.A. and up to 85 P.K.V. Control is fine, both milliamperage and kilovoltage being variable. The tubehead is easily raised or lowered, or turned in any required direction. Tubehead readily lowers under table. The hand timer is best quality, measures time in one-fourth seconds, maximum 12 seconds. The x-ray tube is of the latest type and gives exceptional definition in both radiography and fluoroscopy. FISCHER Model "GA-15" is quality construction throughout and will give splendid performance. Standard finishes are black kristokrak or hammered gray with various metal parts in chromium.

No.	•	Code
4478B	**FISCHER Model "GA-15" Mobile, Portable Shockproof X-Ray Apparatus (chrome plates) complete with control box, cone and hand timer**	TILPE

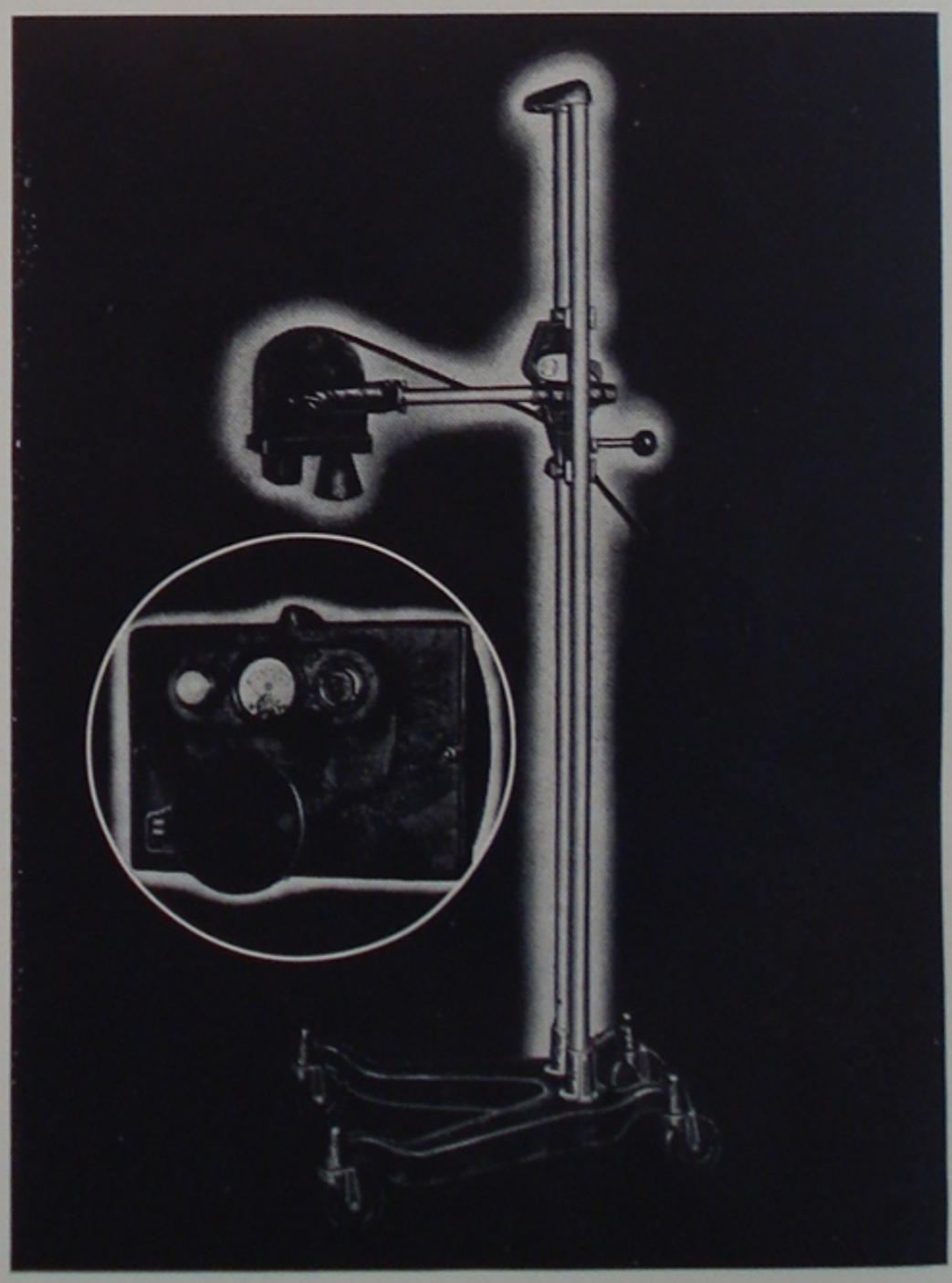
Ask for descriptive pamphlet Form 1866B

FISCHER Model "HA-10" Shockproof X-Ray Apparatus

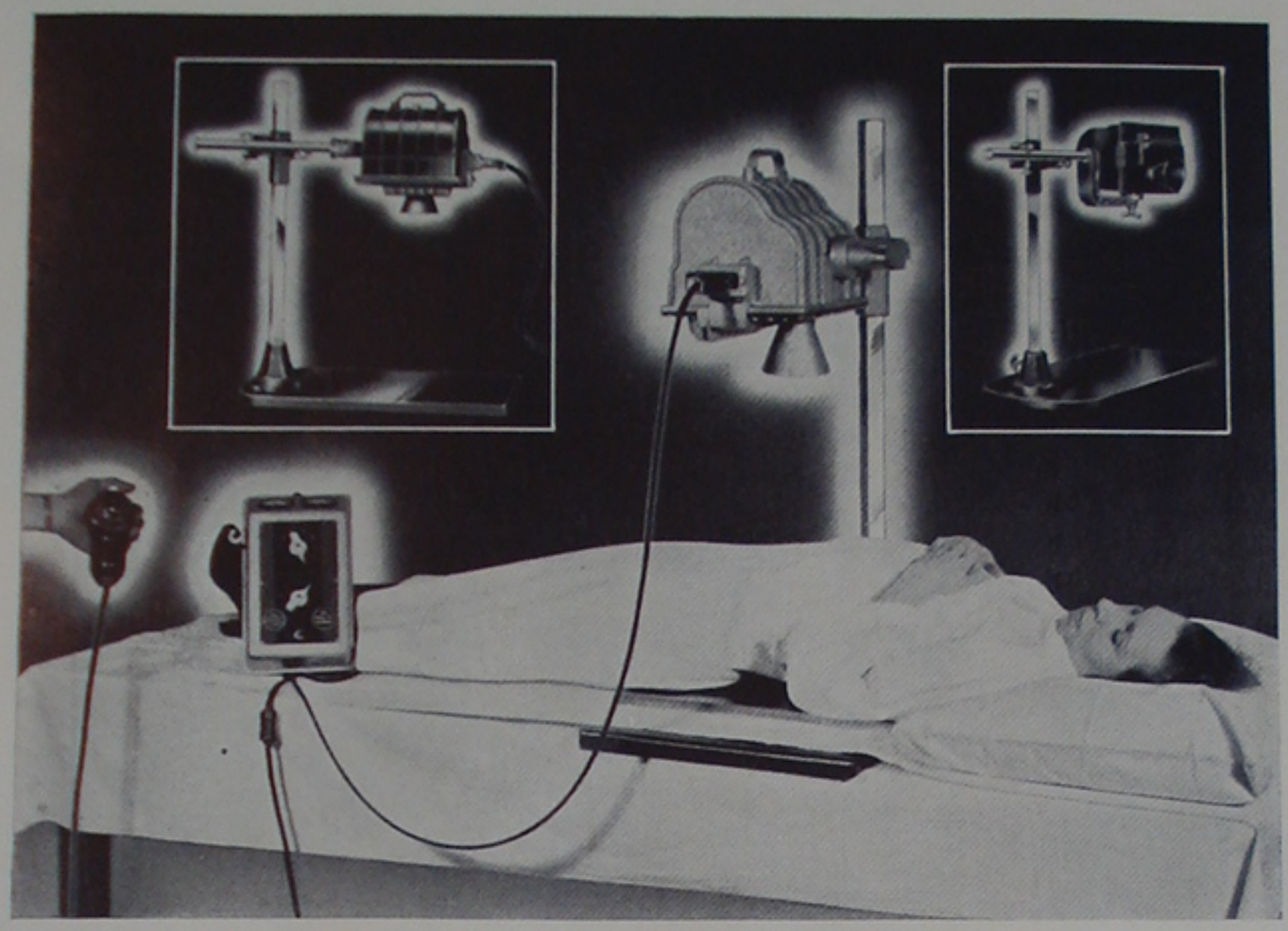
FISCHER Model "HA-10" differs from FISCHER Model "GA-15" in two respects—power is less (10 M.A. at 67 P.K.V.) and the controls are set so that output is fixed. Milliamperage and kilovoltage are not variable. Special features to be mentioned are: This unit is shockproof throughout. It is both mobile and portable. May be used with or without table. Designed primarily for radiography, fluoroscopy is also available, using a hand or operating fluoroscope or suspended screen. The tubehead is completely flexible and may be readily placed in any required position, above or below table. The latest type x-ray tube is used, providing finest detail. The hand timer is best quality, measures time in one-fourth seconds, maximum, 12 seconds. FISCHER Model "HA-10" is quality construction. Standard finishes are black kristokrak or hammered gray. Various metal parts chromium.

No.	•	Code
4479A	**FISCHER Model "HA-10" Mobile, Portable, Shockproof X-Ray Apparatus, including hand timer and cone**	TIBUX

Ask for descriptive pamphlet Form 1909



FISCHER Model "G" Portable X-Ray Apparatus

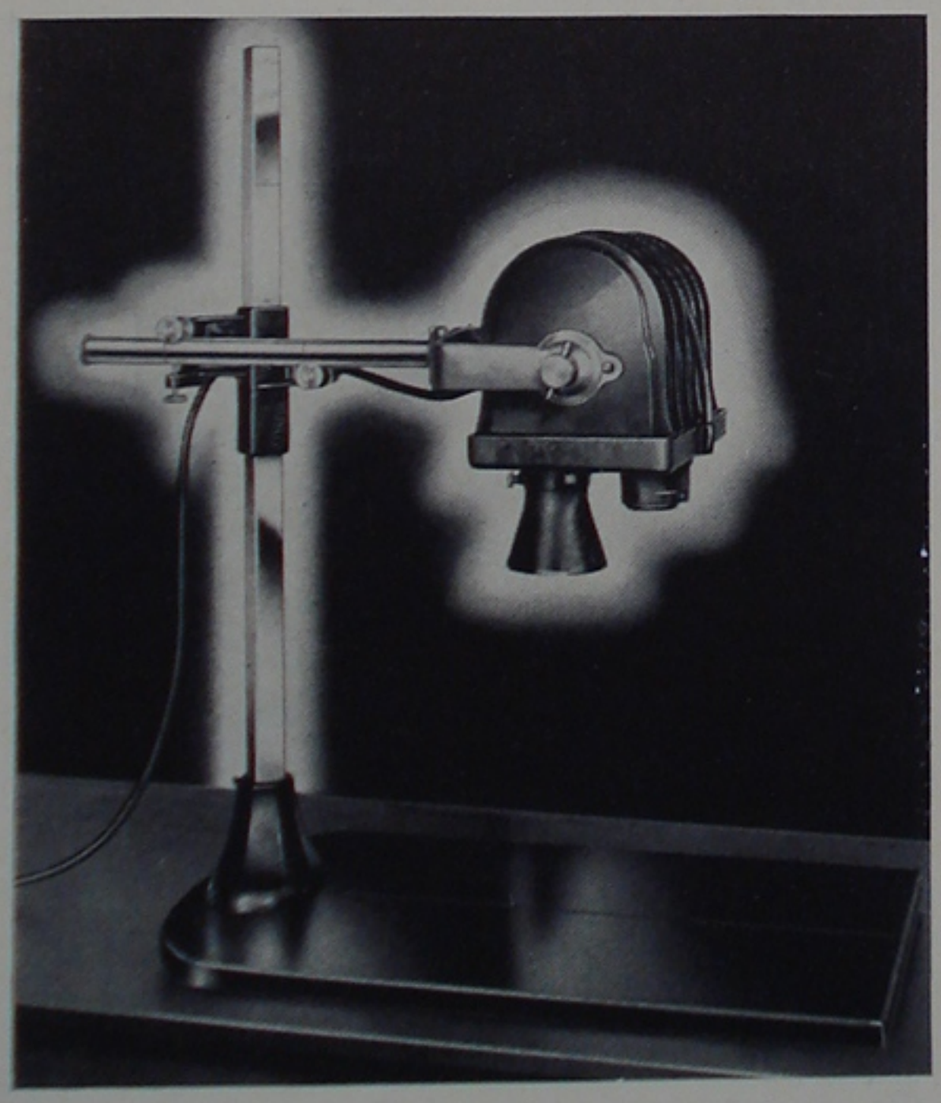


THIS unit is available in the arrangement shown—including tubehead, table stand, control box and hand timer. It has been designed to provide a truly portable unit giving fine performance at low cost. The following features are worthy of note: The unit is shockproof throughout; power is up to 15 M.A. and up to 85 P.K.V.; both radiography and fluoroscopy are available; the latest-type, fine-focus tube gives exceptional definition. With the special control box, both milliamperage and kilovoltage are variable. The hand timer measures time in one-fourth seconds, maximum 12 seconds. Quality materials and construction are used throughout. Finishes are black kristokrak or hammered gray and chromium. Ivory finish at slight additional cost. When desired, this Model "G" may be had mounted on a special stand with four adjustable legs.

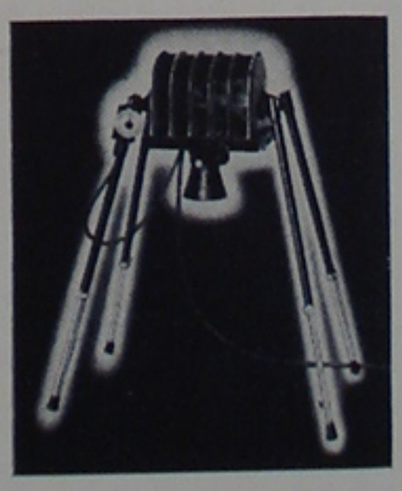
No.		Code
4482A	FISCHER Model "G" Portable Shockproof X-Ray Apparatus, including tubehead, table stand, control box and hand timer	TIEGS
4483A	Same as above except table stand replaced by special stand with four adjustable legs	TIEHR

Ask for descriptive pamphlet Form 1945

FISCHER Model "H" Portable X-Ray Apparatus



IN designing FISCHER Model "H", the purpose has been to provide a portable unit to meet specific needs. This unit is available either with table stand mounting or with adjustable-legs mounting as shown. There is no remote control box. The following features are worthy of note: The unit is shockproof throughout; it is easily portable; flexibility is marked; power is up to 10 M.A. and up to 67 P.K.V. This output is fixed, that is, not variable. Operation is very simple and both radiography and fluoroscopy are available, the latter with hand or operating fluoroscope or suspended screen. The tube gives exceptional definition. Construction throughout is highest quality. The finish is black kristokrak or hammered gray and chromium.



FISCHER portable x-ray apparatus is recommended also as a supplementary unit with a large fixed installation.

No.		Code
4408	FISCHER Model "H" Portable Shockproof X-Ray Apparatus, table stand mounting	TAEJK
4125	FISCHER Model "H" Portable Shockproof X-Ray Apparatus, adjustable leg mounting	TAMEB

Ask for descriptive pamphlet Form 1755C

FISCHER Dental X-Ray Apparatus



FISCHER Wall-Mounted Shockproof Dental X-Ray Unit

A HIGHEST-QUALITY apparatus, embodying every advanced feature of mechanical and electrical construction. Designed for wall-mounting only. Among outstanding features are the following:

1. This unit is absolutely shockproof throughout. No exposed wiring.
2. It is 100% flexible. All positions easily and instantly obtainable while patient remains seated in the dental chair.
3. Power is more than ample and radiographic results are excellent.
4. Control is very fine. Angles can be reproduced.
5. Construction is very compact. Only the finest materials are used. Tube and transformer housed in one-piece drawn steel tank.
6. Optional finish—ivory tan or mahogany.

No.		Code
4485	**FISCHER Wall-Mounted Shockproof Dental X-Ray Apparatus**	**TIBRS**

Ask for descriptive pamphlet Form 1869

FISCHER Mobile Shockproof Dental X-Ray Unit

THIS apparatus differs from the FISCHER Wall-Mounted unit only in the method of mounting. Mobility is provided by free-rolling casters. The pedestal is sturdy and free of vibration. Features of structure-operation are the same as for the wall-mounted model.

1. This unit is absolutely shockproof throughout. No exposed wiring.
2. It is 100% flexible. All positions easily and instantly obtainable while patient remains seated in the dental chair.
3. Power is more than ample and radiographic results are excellent.
4. Control is very fine. Angles can be reproduced.
5. Construction is very compact. Only the finest materials are used. Tube and transformer housed in one-piece drawn steel tank.
6. Optional finish—ivory tan or mahogany.



No.		Code
4488	**FISCHER Mobile Shockproof Dental X-Ray Unit**	**TIEPI**

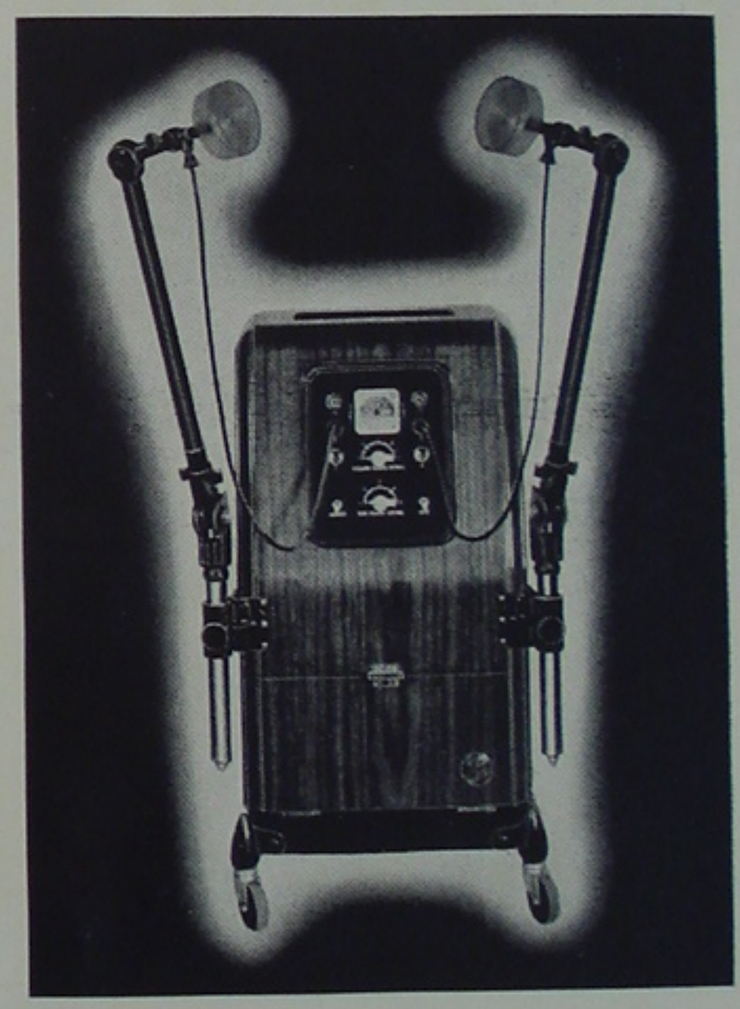
Ask for descriptive pamphlet Form 1889



FISCHER Model "S" Short Wave Apparatus

Permits choice of 6-meter or 12-meter wave length. Available (1) with chassis mounted in portable case in cabinet; or (2) with chassis mounted directly in cabinet; or (3) portable section only may be purchased. Naturally the different arrangements have different catalog symbols.

FISCHER Model "S" Short Wave Apparatus is a four-tube unit. The tubes are exceptionally powerful and durable. The entire apparatus is constructed of the very finest materials. Flexibility is a marked feature—applications may be made with the inductance disc, which is regular equipment, or with the inductance cable or condenser cuff, pad or insulated orificial electrodes. Air-spaced electrodes are available as shown. Performance is backed by the usual strong FISCHER guarantee. Below is given a list of the outstanding features of structure-operation.



Features of STRUCTURE-OPERATION

1. POWER. Whether the area to be heated is large or small, sinus or joint, or more inclusive body parts this unit will give superb results.
2. TUBES. FISCHER Model "S" is a four-tube unit. The tubes are of special heavy design and are exceptionally efficient. Performance is notably superior and the tubes are more durable.
3. PATIENT'S OUTLETS. There are six patient's outlets, four for condenser electrodes or air-spaced electrodes and two for the inductance disc or inductance cable. The three potentials afforded by the four condenser electrode outlets are a special feature in FISCHER models.
4. CONTROLS. The main volume control operates in connection with the auxiliary volume control. Control is fine, making it possible to apply power to the patient at any level from zero to maximum.
5. DURABILITY. FISCHER Model "S" is designed and constructed to give a lifetime of efficient service.
6. ELECTROSURGICAL CURRENTS. Such modern technics as electrocoagulation and electrosurgical tissue cutting are available. The various electrodes plug directly into patient's outlets.
7. OPTIONAL FINISH. FISCHER Model "S" is available in two-tone walnut or in plain ivory.

No.		Code
4420	**FISCHER Model "S"—12 meters—(chassis mounted in portable case in cabinet) complete with flexible arm and inductance disc, also 2 condenser pad electrodes (5½" x 8½")**	TIALM
4422	**FISCHER Model "SP"—12 meters—portable section only with inductance cable (including separator blocks) and 2 condenser pad electrodes (5½" x 8½")**	TIANO
4520	**FISCHER Model "S"—6 meters—(chassis mounted in portable case in cabinet) complete with flexible arm and inductance disc, also 2 condenser pad electrodes (5½" x 8½")**	TIAOR
4522	**FISCHER Model "SP"—6 meters—portable section only with inductance cable (including separator blocks) and 2 condenser pad electrodes (5½" x 8½")**	TIAST
4516	**FISCHER Model "SC"—12 meters—(chassis mounted directly in cabinet) complete with flexible arm, inductance disc and 2 condenser pad electrodes (5½" x 8½")**	TIJVE
4518	**FISCHER Model "SC"—6 meters—(chassis mounted directly in cabinet) complete with flexible arm, inductance disc and 2 condenser pad electrodes (5½" x 8½")**	TIJTG

Ask for descriptive pamphlet Form 1863



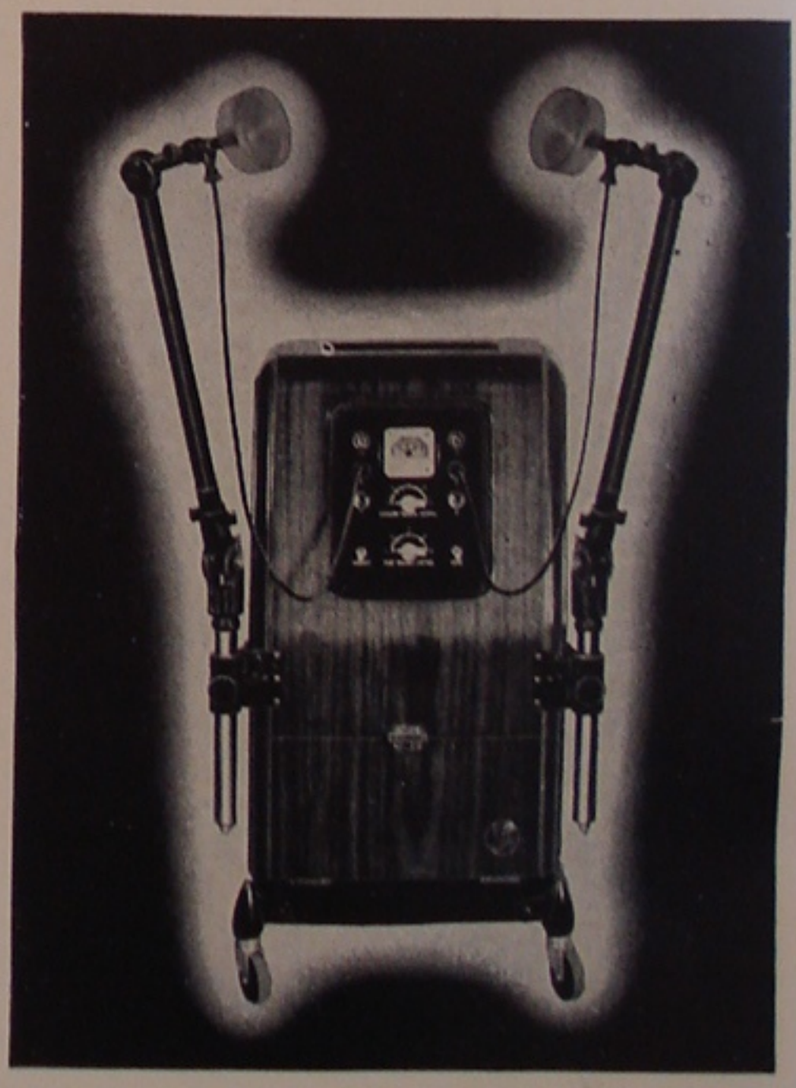
FISCHER Model "A" Short Wave Apparatus

Available (1) with chassis mounted in cabinet or (2) with chassis mounted in portable case in cabinet, or (3) portable section only may be purchased.

FISCHER Model "A" Short Wave Apparatus is a single tube unit, designed to meet the varying needs of physicians, hospitals, clinics. Model "A" has the chassis mounted directly in the cabinet. When chassis is mounted in portable case in cabinet, this apparatus is catalogued as Model "PAC". The portable section only, that is, without cabinet, is catalogued as Model "PA". The inductance disc is regular equipment except with the portable section only (Model "PA") which prevents mounting. Applications may be made also with the inductance cable, condenser cuff, pad, and insulated orificial electrodes. Air-spaced electrodes can be supplied and attached as shown. Below is given a list of the more important features of structure-operation.

Features of STRUCTURE-OPERATION

1. POWER. Whether the region to be heated be large or small, sinus, joint or more inclusive body part, this unit gives excellent results.
2. WAVE LENGTH. FISCHER Model "A", also Models "PA" and "PAC", have a wave length of 12 meters.
3. TUBE. Unusually efficient. Has extreme ruggedness and ability to stand up under tremendous service.
4. PATIENT'S OUTLETS. There are six patient's outlets, four for condenser electrodes or air-spaced electrodes and two for the inductance disc or inductance cable. The three potentials afforded by the four condenser electrode outlets are a special feature.
5. CONTROLS. The main volume control operates in connection with the auxiliary volume control. It is possible to apply power to the patient at any level up to maximum.
6. FLEXIBILITY OF APPLICATION. Not only all types of applications but applications with all types of electrodes are possible with Models "A" and "PAC". Model "PA" does not permit use of universally flexible arm or applications with inductance disc or air-spaced electrodes.
7. ELECTROSURGICAL CURRENTS. Such modern technics as electrocoagulation and electrosurgical tissue cutting are available.
8. VENTILATION. This is provided at top of cabinet and at back. Ample ventilation is necessary, when a unit operates for long periods, to prevent tube from overheating.
9. ADVANCED CONSTRUCTION. Only the finest materials are used. Construction is of the chassis type. Large storage space.
10. FINISH. Cabinet is two tone walnut. Metal parts are chromium plated. The portable section is in black kristokrack.



No.		Code
4660	**FISCHER Model "A" (chassis mounted directly in cabinet)—complete with flexible arm, inductance disc and 2—5½" x 8½" electrodes**	**TIJMO**
4652	**FISCHER Model "PAC" (chassis mounted in portable case in cabinet) complete with flexible arm, inductance disc and 2—5½" x 8½" electrodes**	**TIJYB**
4653	**FISCHER Model "PA" (portable section only) complete with inductance cable and 2—5½" x 8½" electrodes**	**TIJRK**

Ask for descriptive pamphlet Form 1926

FISCHER Model "B" Ultra Short Wave Unit

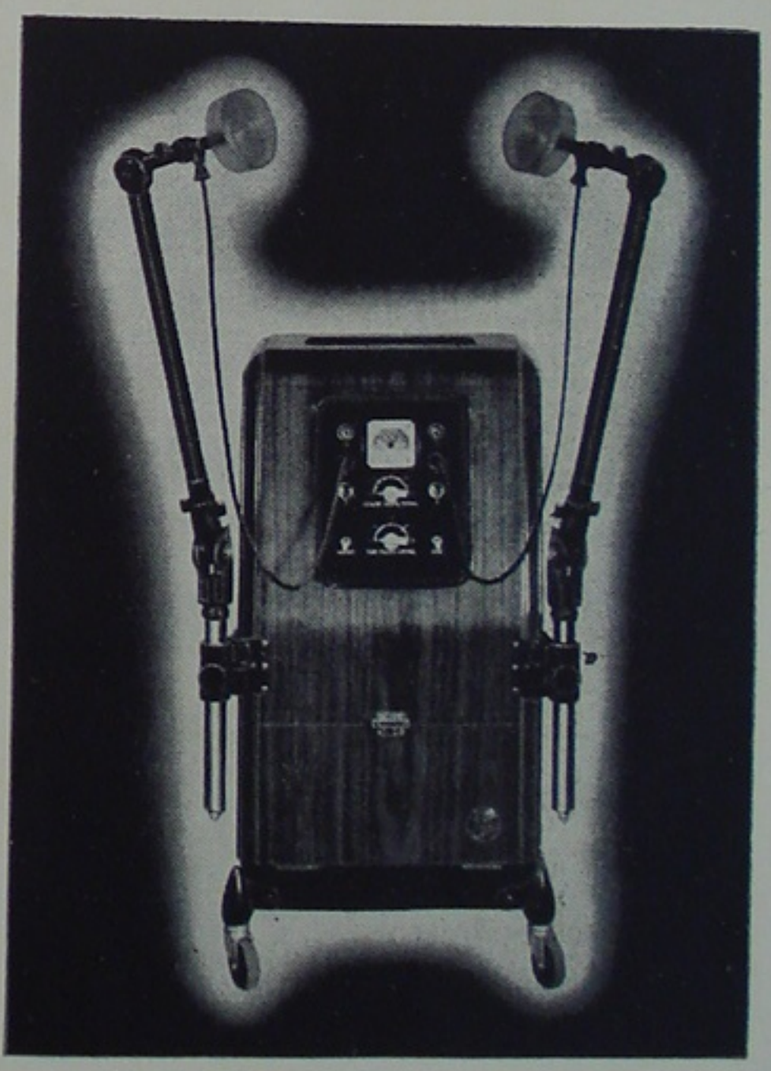


This is a two-tube apparatus giving highly efficient performance. The chassis is mounted directly in the cabinet.

FISCHER Model "B" Ultra Short Wave Unit is distinguished by two features: (1) it is an all-service apparatus producing excellent results; (2) it is remarkably low in price. This unit will provide every service needed in short wave diathermy. Applications may be made with the inductance disc, which is regular equipment, or with the inductance cable or condenser cuff, pad or insulated orificial electrodes. Air-spaced electrodes can be supplied and attached as shown. Only the finest materials are used in construction. Performance is backed by the usual strong FISCHER guarantee. Below is given a list of the more important features of structure-operation.

Features of STRUCTURE-OPERATION

1. POWER. Whether the region to be heated be large or small, sinus, joint or more inclusive body part, power is ample.
2. TUBES. Two tubes of special design are used in FISCHER Model "B". There is low loss of energy and accordingly highly efficient performance.
3. PATIENT'S OUTLETS. There are six patient's outlets, four for condenser electrodes and two for the inductance disc or inductance cable. The three potentials afforded by the four condenser electrode outlets are a special feature. Outlets for the inductance cable are larger and prevent cable being plugged into wrong outlets.
4. CONTROLS. The main volume control operates in connection with the auxiliary volume control. It is possible to apply power to the patient at any level up to maximum.
5. ELECTROSURGICAL CURRENTS. Such modern technics as electrocoagulation and electrosurgical tissue cutting are available.
6. VENTILATION. This is provided at top of cabinet and at back. Ample ventilation is necessary, when a unit operates for long periods, to prevent tubes from overheating.
7. FINISH. Cabinet is two-tone walnut. It has a beautiful hand-rubbed finish. Metal parts are chromium plated.



No.		Code
4665	**FISCHER Model "B" including inductance disc and universally flexible arm, also two 5½" x 8½" pad electrodes**	TIKON
4664	**FISCHER Model "B" less accessories, that is, without inductance disc, flexible arm and the two pad electrodes**	TIKPL
4434	**Extra Supporting Arm, should two arms be desired for air-spaced electrodes**	TEBAC
4444	**Single Air-Spaced Electrode—consisting of electrode body, 4" disc, 2" disc and connecting cord**	TECAA

Ask for descriptive pamphlet Form 1928

FISCHER Model "CK" Ultra Violet Generator
FISCHER Model "K" Ultra Violet Generator



FISCHER Ultra Violet Generators are made in two models—FISCHER Model "CK" and FISCHER Model "K". In FISCHER Model "CK", the grid burner has two parallel burner tubes, one of pure quartz and one of corex. A three-way switch permits operation of either the quartz or the corex burner separately, or both may be operated together. In FISCHER Model "K", there is only one burner tube of pure quartz. Other parts of the apparatus are identical.

FISCHER Ultra Violet Generators are compact, attractive, mobile—mounted on free-rolling casters. Note low transformer giving great stability. The reflector is highly polished, backed by moulded bakelite. The cross-arm is instantly adjustable. The upright may be extended to 60". A spring in the upright prevents cross-arm and reflector from jar and possible damage, should it be accidentally released or dropped during adjustment. There is an automatic timer in the transformer housing, also plus-lined pocket for holding and protecting orificial burner. The design of the grid-burner reflector assures even distribution of the ultra-violet rays over body surfaces. Naturally output is instant—there is no waiting before application can be made—an important saving of time.





Features of STRUCTURE-OPERATION

1. FISCHER Ultra Violet Generators embody every modern and approved feature of design, efficiently meeting every need for both surface and orificial application.

2. The energy output is more than sufficient for all application needs. Output also remains constant—does not diminish with use of the burners.

3. The quartz burner produces rays ranging from 1849 to 3,900 AU, with greatest intensity of output around 2,550 AU. Radiation from the corex tube or burner differs only in that some of the shorter rays are cut off, greatest intensity of output being around 3,200 AU.

4. FISCHER Ultra Violet Generators afford complete ultra violet therapy. There are two burners, the grid-type for skin or surface applications and the orificial burner for orificial applications.

5. Patient and operator are singularly safe. There is no possibility of electric shock nor danger from hot mercury should a burner become accidentally broken.

6. An outstanding advantage is the saving of time in making applications. Treatment can begin the instant the electric current is turned on. The ample output effects shortened treatment periods.

7. Finish is optional—black or hammered gray. Ivory also available. Various metal parts in chromium.

No.		Code
4368	**FISCHER Model "CK" UltraViolet Generator including grid and orificial burners, also one pair of goggles**	TIRDA
4370A	**FISCHER Model "K" UltraViolet Generator including grid and orificial burners, also one pair of goggles**	TATXX

Ask for descriptive pamphlet Form 1952



FISCHER Model "J" Galvanic and Contractile Currents Generator

A GALVANIC and contractile currents generator is one of the most widely indicated and most frequently useful units of electrotherapeutic apparatus. This FISCHER Model "J" Generator meets every need and is recommended both by finest performance and remarkably low price.

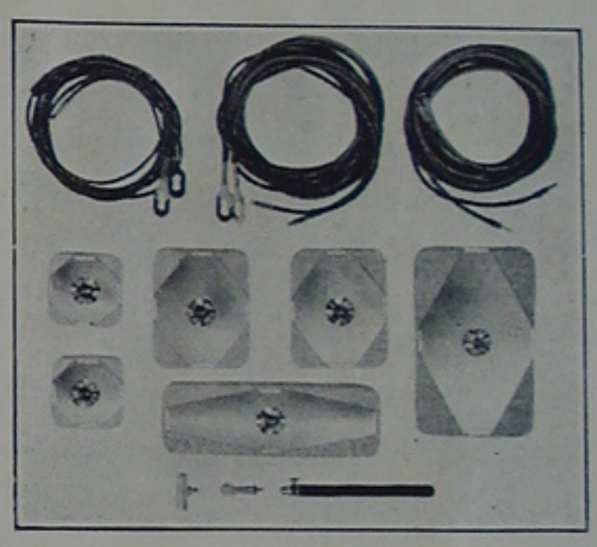
FISCHER Model "J" Galvanic and Contractile Currents Generator produces all the low voltage currents approved by authorities. The galvanic current is straight line and all contractile currents exact as to wave form—they will remain exact as long as the apparatus is used—due to the heavy, patented flat commutator. Control is exceptionally fine, incomparably in advance of control in former units. Currents wanted are selected by simply turning the two current selector switches to the proper numbers. Whether used for medical galvanism, common ion transfer, or surgical galvanism, this generator will give wholly satisfactory performance.

ACCESSORIES

View above shows new FISCHER Model "J" Galvanic and Contractile Currents Generator. View right shows accessories included with generator—connecting cords, electrodes and handle. Among special features to be emphasized are the following: The current chart on the control panel, giving keys to currents wanted, the quick-reading meters, the slip-proof patient's outlets, the silent operation of the unit. Construction is in every way highest quality. The cabinet is all-steel. A choice of finishes is offered—black Kristokrak, hammered gray, or ivory.

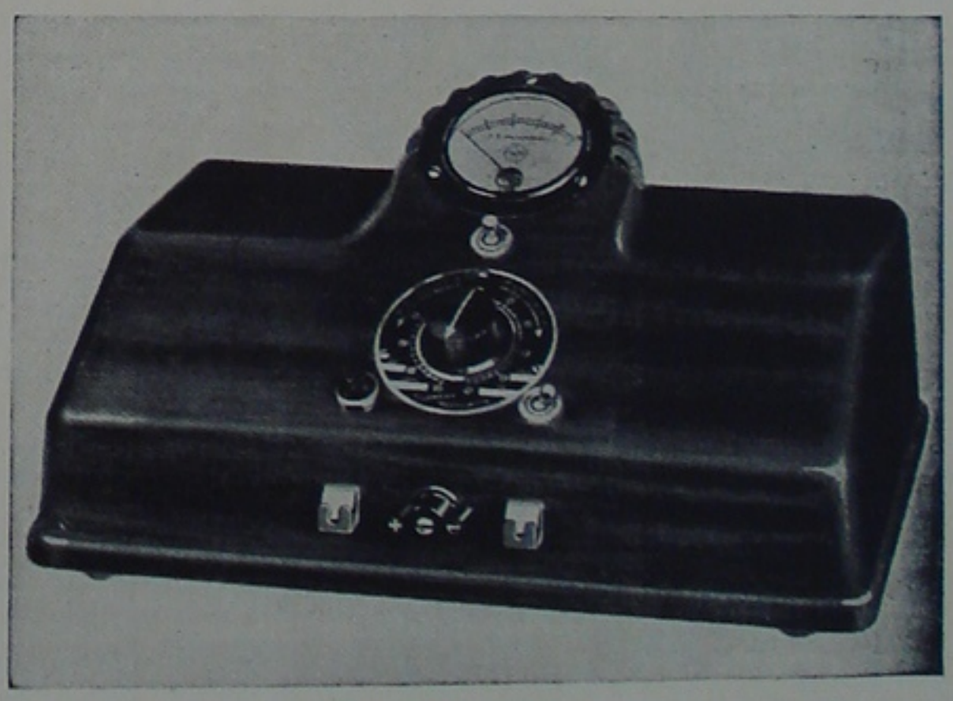
No.		Code
4301	**FISCHER Model "J" Galvanic and Contractile Currents Generator with Connecting Cord and Accessories as listed above**	TATAB

Ask for descriptive pamphlet Form 1836A



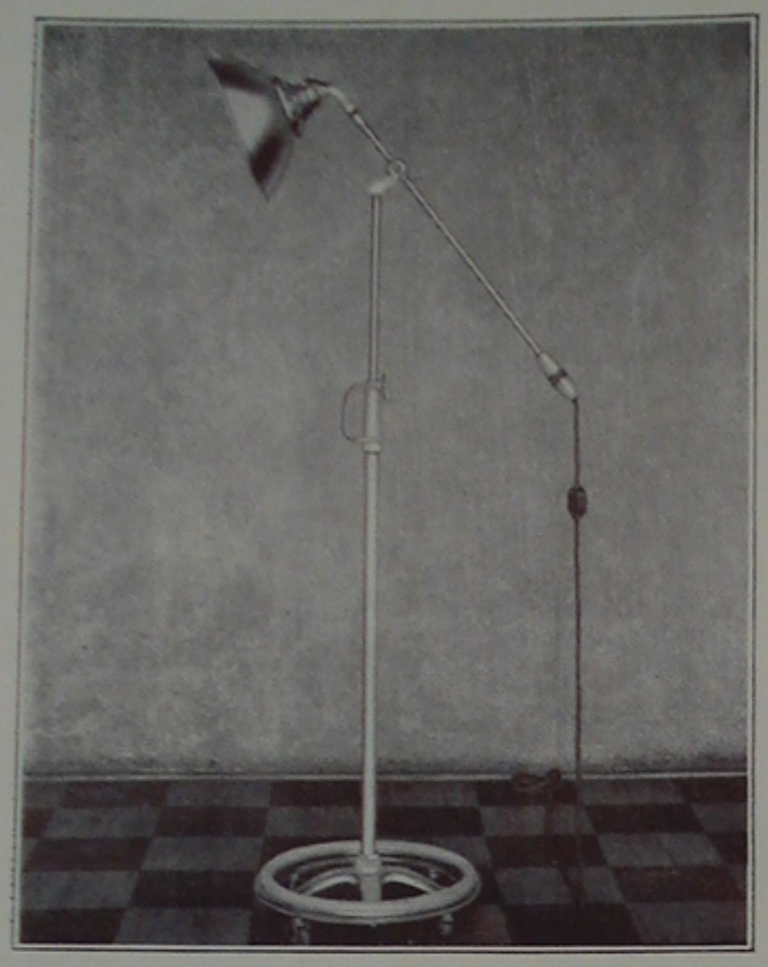
FISCHER Galvanic Current Generator

THE extreme importance of the galvanic current in the practice of modern medicine is recognized by the majority of physicians of today, in gynecology, urology, etc., for depilatory work, ionization, rectal lesions, electrolysis, strictures, etc. The outstanding features of this unit are: perfect smoothness of the current; a galvanic output comparable to that of a battery source absolutely without fluctuation; noiseless operation; a polarity switch for pole-changing; a pilot light; black kristokrak finish. The current volume is controlled down to 1/25th part of a milliampere. This means that with this apparatus you can employ galvanism for all of its varied uses without any jerky or painful sensations, a value which will be apparent at once to the physician.



No.		Code
2552	**Improved Galvanic Current Generator only (A. C.)**	ZITWY
2553	**Special Stand for No. 2552**	GALZE

Ask for descriptive pamphlet Form 1299F.

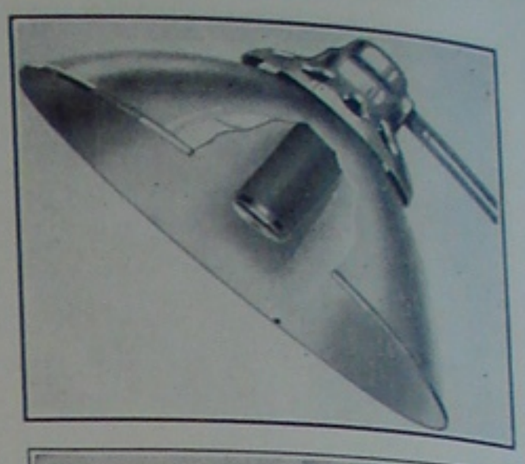


FISCHER Infra-red Generator includes connecting cord for electrical outlet. Switch in cord. Note adjustable upright. Reflector mounting also adjustable, permitting operator to direct rays at will. Convenient handle for moving or carrying. Reflector, polished aluminum.

FISCHER Infra-Red Generators

MADE in two styles—regular model as shown in large illustration and model with faceted reflector (lower right). Base and standard are the same in both models. The stand is adjustable, also arm carrying reflector. Reflector may be raised to over 6 ft. from floor or lowered to within 2 ft. of floor. Diameter of reflector, 11 inches. Weight of reflector is accurately counterbalanced. Base mounted on free-rolling casters.

The heating element used in this generator is durable, will not flake. The deep, penetrating infra-red rays are produced, rather than visible rays. May be had in either 200 or 400 watt sizes. Unscrews for replacing.



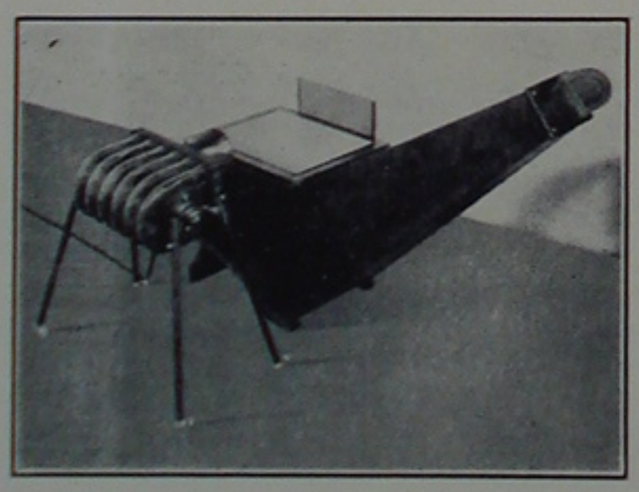


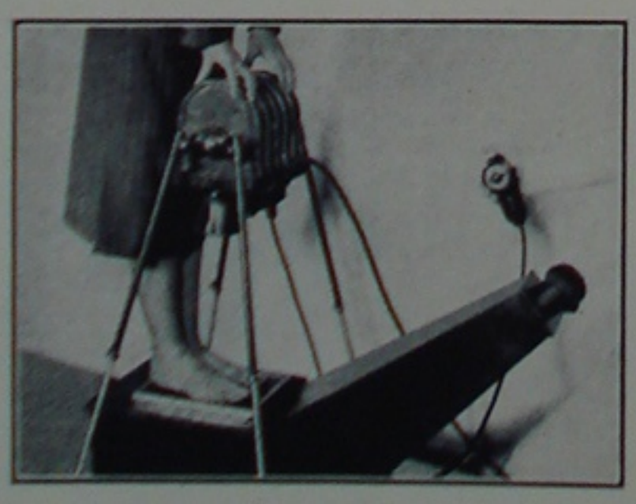
At top: View of heating element. At bottom: Generator with faceted reflector.

No.		Code
2281	FISCHER Infra-red Generator—Regular Reflector—400 watt element	NEWRE
4039	FISCHER Infra-red Generator—Faceted Reflector—200 watt element	TAFFA
4040	FISCHER Infra-red Generator—Faceted Reflector—400 watt element	TAGAB
2282	400 watt Infra-red Element	ELRED
2284	200 watt Infra-red Element	ZECUX

Ask for descriptive folder Form 1733A

FISCHER Chiropodist's Fluoroscope



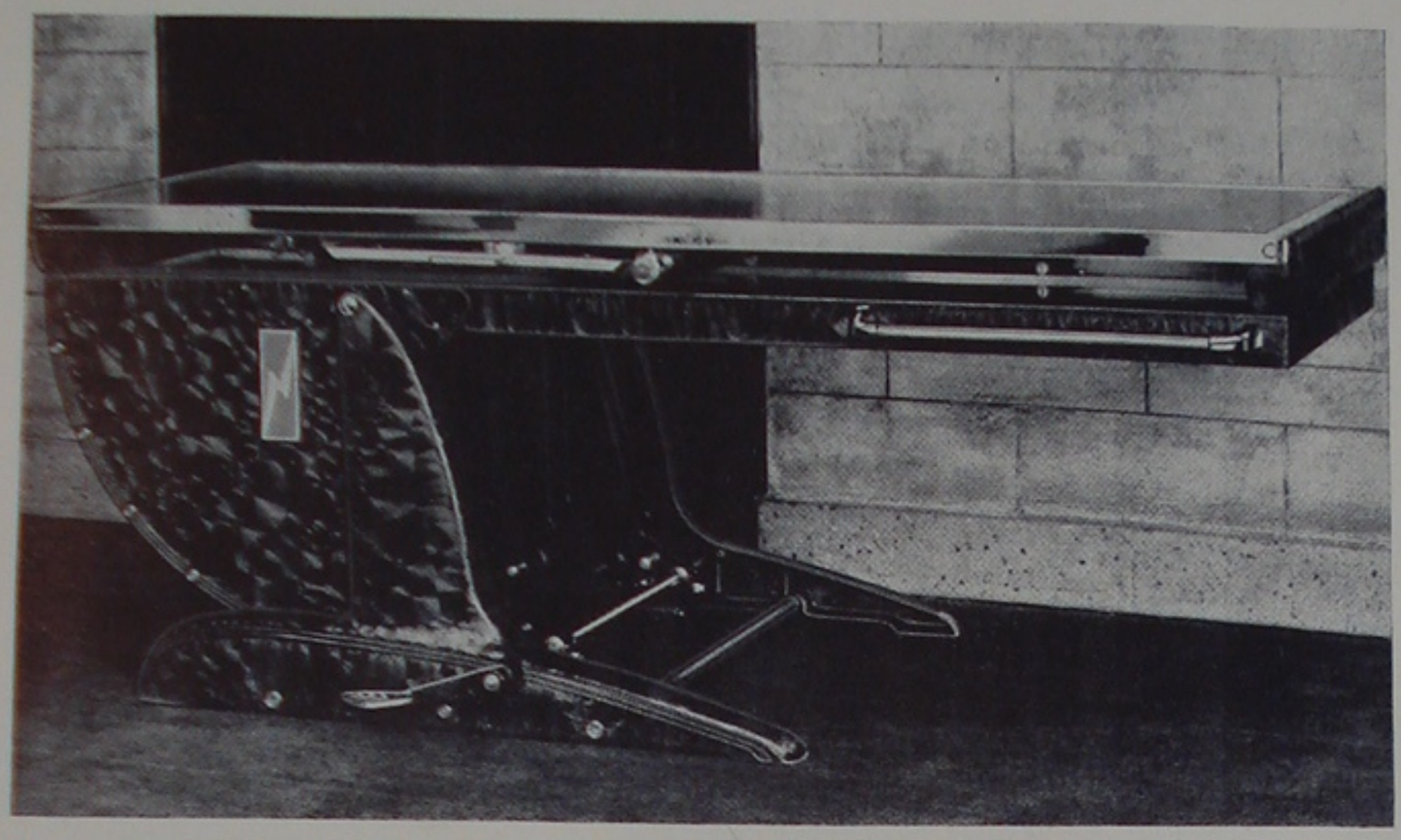


The diagnostic value of radiography and fluoroscopy in chiropody needs no comment. Leaders in the profession, who have had extensive experience with the x-ray, not only emphasize its great help in locating and identifying the causes of orthopedic difficulties, but have invariably found that patients are pleased with x-ray service. X-ray facilities, say these leaders, result not only in better service to patients, but also in increased business and income for the chiropodist himself. The illustrations herewith show the FISCHER Chiropodist's Fluoroscope in use with FISCHER Model "H" Shockproof X-Ray Apparatus. This combination makes it possible for the chiropodist to avail himself of both radiography and fluoroscopy. Advantages are—x-rays reveal exostoses, bone tumors, fractures, dislocations, subluxations, march foot, stages of ossification, anomalies. Pathological conditions are revealed, such as arthritis, calcareous deposition, infiltration, ankyloses, osteoporoses, decalcifications, sequestrums, necroses, purulent pockets, abscesses. Diagnoses can be proved. Feet can be studied in shoes and foot appliances better fitted.

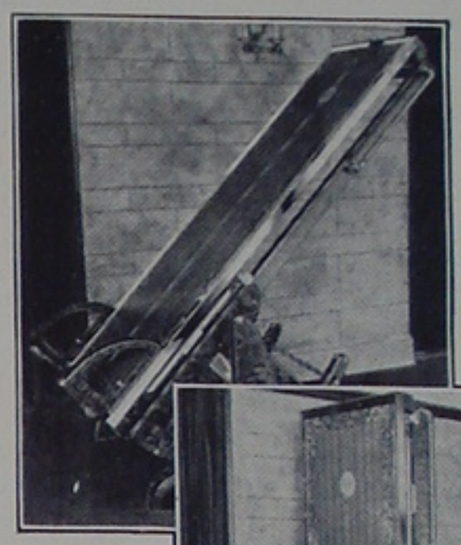
No.		Code
4341	FISCHER Chiropodist's Fluoroscope with Patterson "B" Screen	TATWA

Ask for descriptive pamphlet Form 1790

FISCHER Radiographic and Fluoroscopic Tilt Table



DESIGNED for use in both radiography and fluoroscopy. Construction is exceptionally rigid, the various parts being solid and massive. Weight is approximately 500 lbs. The adjusting pins are of steel, heavy and unbreakable. Positions or angles of the table may be varied from 15° below horizontal (Trendelenberg position) to exactly upright. Rigid stops are provided at every 15° of arc.

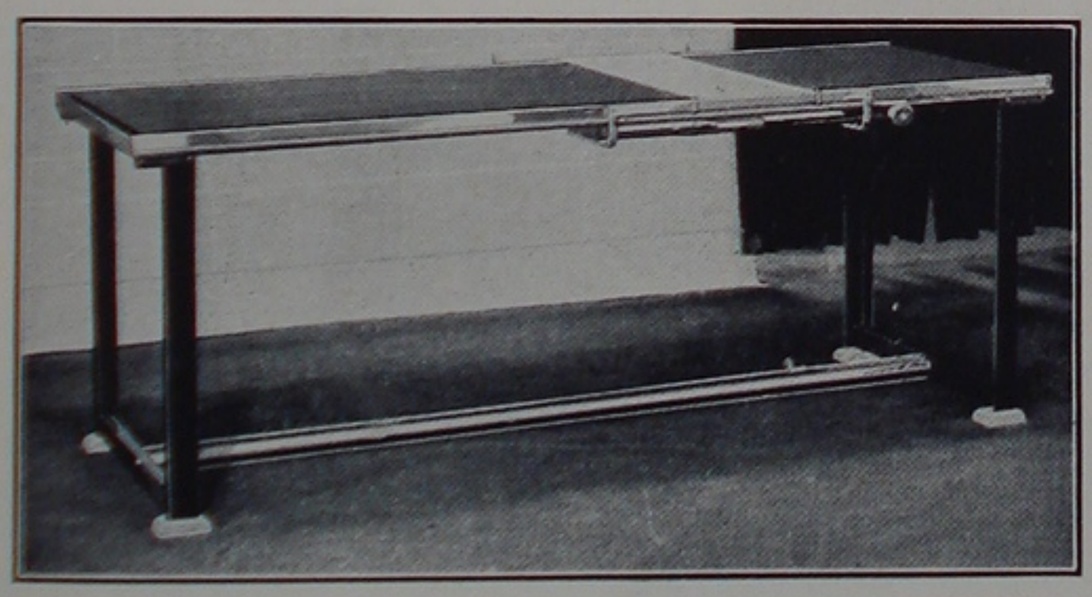




A touch moves the table up or down as desired. Should, by accident, the table be released, it would not fall, will not of itself drop all the way to the lowest position without a slight push. Counter balancing is exact regardless of position of the Bucky. Bucky also counterbalanced exactly. Locks in any position. A movable seat or shoulder rest is provided, which can be set in any position along table top. The finish is black kristokrak or made to match the finish on x-ray apparatus at small additional cost. Metal parts are in chromium.

No.		Code
4035	FISCHER Radiographic and Fluoroscopic Tilt Table, including No. 4045	TABBA
4036A	Same as No. 4035 but with 17″ Synchrotimed Bucky	TAOII
4045	Shoulder Rest and Seat for Tilt Table, No. 4035	TABAB
4034	Same as No. 4036A but with 36″ Bucky	TAKML
4050C	FISCHER Tilt Table Roller Attachment to fit Tilt Table to New Sectional Flat Track	TEBLK

FISCHER Roentgenographic Table (with or without Bucky)



Illustrations showing this FISCHER Roentgenographic Table as integral parts of the various Models of FISCHER x-ray apparatus—will be found by turning to the preceding pages giving descriptions of respective units.

Designed for use with and will give excellent service with almost any make of x-ray. The same table in materials and construction as used with FISCHER X-Ray Apparatus. All steel frame—angle iron, stoutly reinforced. Masonite top. Length 78 inches. Width 26 inches. Height 28 inches. Metal parts are finished in chromium. Other metal parts in black enamel. FISCHER-Bucky diaphragm is underslung, carried on steel runners mounted with ball bearing rollers. Adjustable heavy muslin band arranged for rendering immobile part to be radiographed. Obtainable with or without Bucky diaphragm.

No.		Code
3532	FISCHER Roentgenographic Table (without Bucky diaphragm)	OIKOI
3534	FISCHER Roentgenographic Table with No. A4059 Bucky diaphragm, for use with "DS-60" Outfit	OCTAD
3535	FISCHER Roentgenographic Table with No. A4061 Bucky diaphragm, for use with "DSP-20" and "SP-60" Outfits	ODSPO

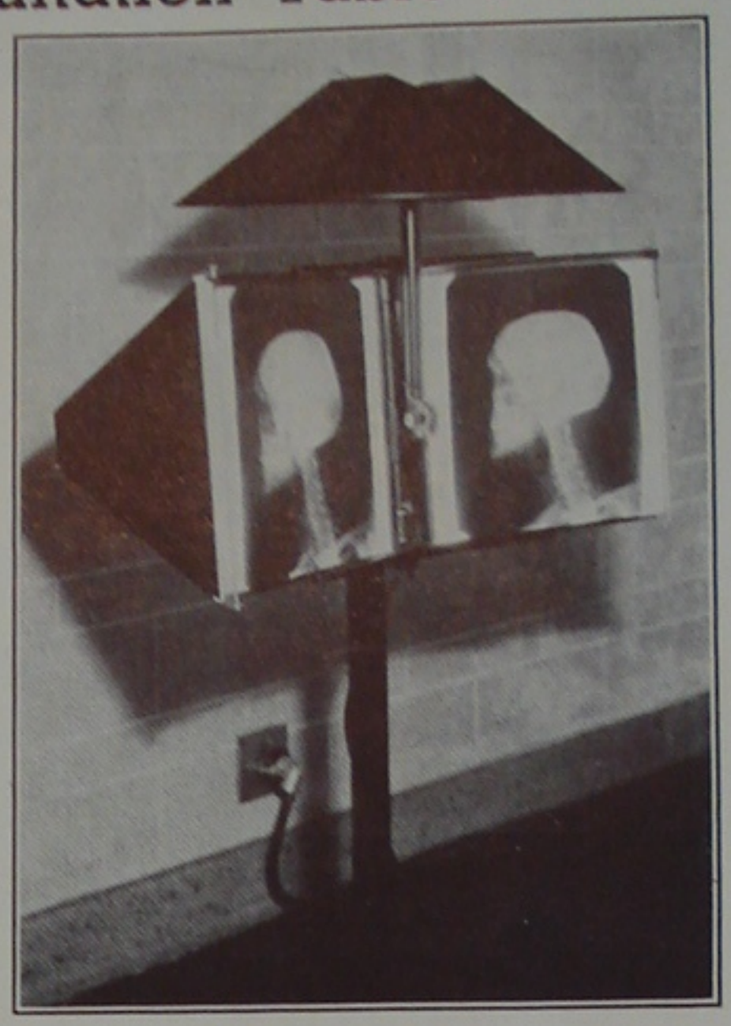
Sectional Rails for FISCHER X-Ray Apparatus

FISCHER sectional rails, both guide and flat, are furnished in standard 2 ft. and 3 ft. lengths, permitting purchase of any desired length in one foot additions. The price of guide and flat rails together is $1.40 per foot. After figuring number of feet, add 30c for guide rail stops.

No.		Code
4096-8	Set of parts of both guide and flat rails to complete 8 ft. installation	TECGF
4096-14	Set of parts of both guide and flat rails to complete 14 ft. installation	TIPLM

STANFORD Stereoscopes — Pedestal, Desk and Consultation Table Models





Pedestal Model

Designed to serve both as a view box and as a stereoscope. When used as a view box, a stereoscopic arrangement lifts out of way. As a stereoscope, this model superimposes the films which are seen clearly in three dimensions. Perfect factory alignment insures users against the annoyance of adjusting mirrors and eye-strain. Viewing surfaces are 17-9/16" x 17-9/16". Only the best materials are used in the construction of this unit. The adjoining illustrations show this model used as view box and as stereoscope.

Desk Model

This model serves exactly the same purposes as the Stanford Pedestal Model. It is "Junior" in size, designed to be placed on desk or table. The viewing surfaces are 14-9/16 inches square, mounted for convenience, either sitting or standing. The adjustable spring rollers fit any size of film to maximum. Construction is highest quality. Unit is very compact. Equipped with two 150-watt, 120-volt high intensity daylight lamps. Note illustrations.







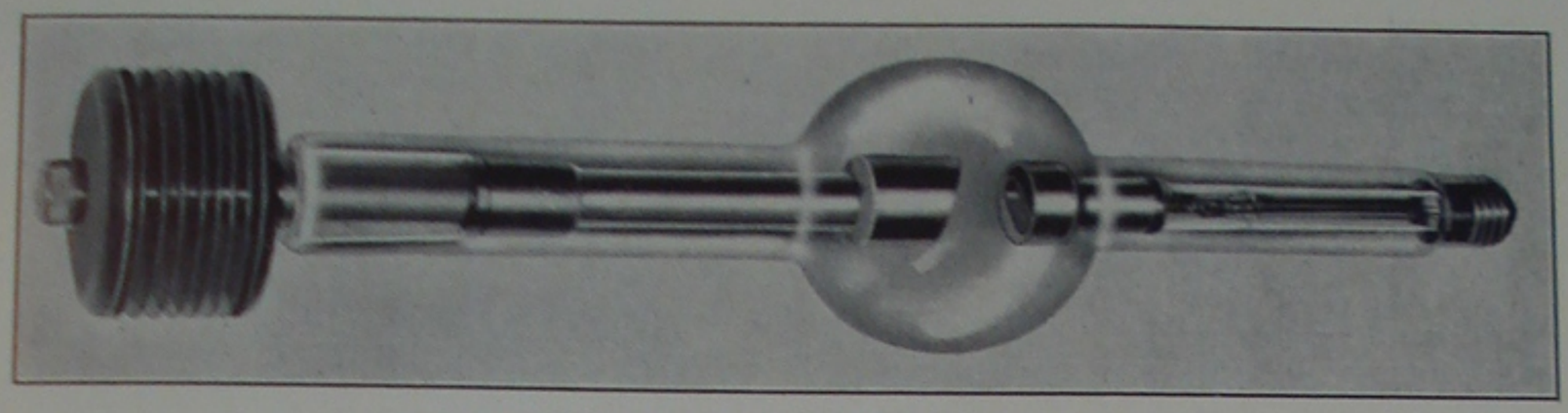
Consultation Table Stereoscope

This unit, as shown, provides for two observers simultaneously, as is necessary in large, consulting practices. Has horizontal viewing surface, cooled by thermo-siphon. Mirrors enclosed to prevent dust reaching them. Recommended as the very best in this type of stereoscope.

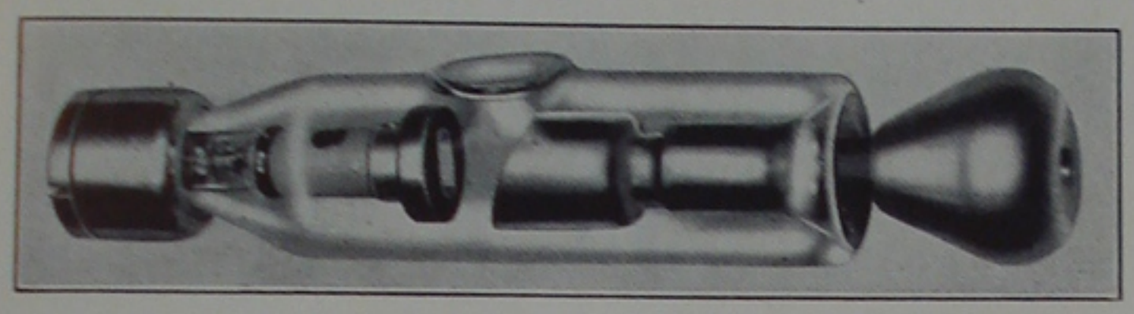
Obviously, the maximum diagnostic value of a radiograph appears only when the proper illuminating device is used. Any good illuminator that produces evenly diffused blue-white light will give a single radiograph a much more brilliant appearance, definitely enhancing the black and white contrasting properties of the radiograph and thus aiding diagnosis. STANFORD Stereoscopes are available with either incandescent or fluorescent lighting. Standard fluorescent equipment operates only on A.C. For D.C. there is a small extra charge.

No.		Code
3710	Stanford Pedestal Stereoscope, connecting cable, two 150-watt daylite lamps	HIPPE
3711	Stanford Desk Model Stereoscope, connecting cable, two 150-watt daylite lamps	TAMNA
3712	Stanford Consultation Table Stereoscope, connecting cable, two 150-watt daylite lamps	TAMAN
3713	Same as No. 3710 but with fluorescent lighting	TIROM

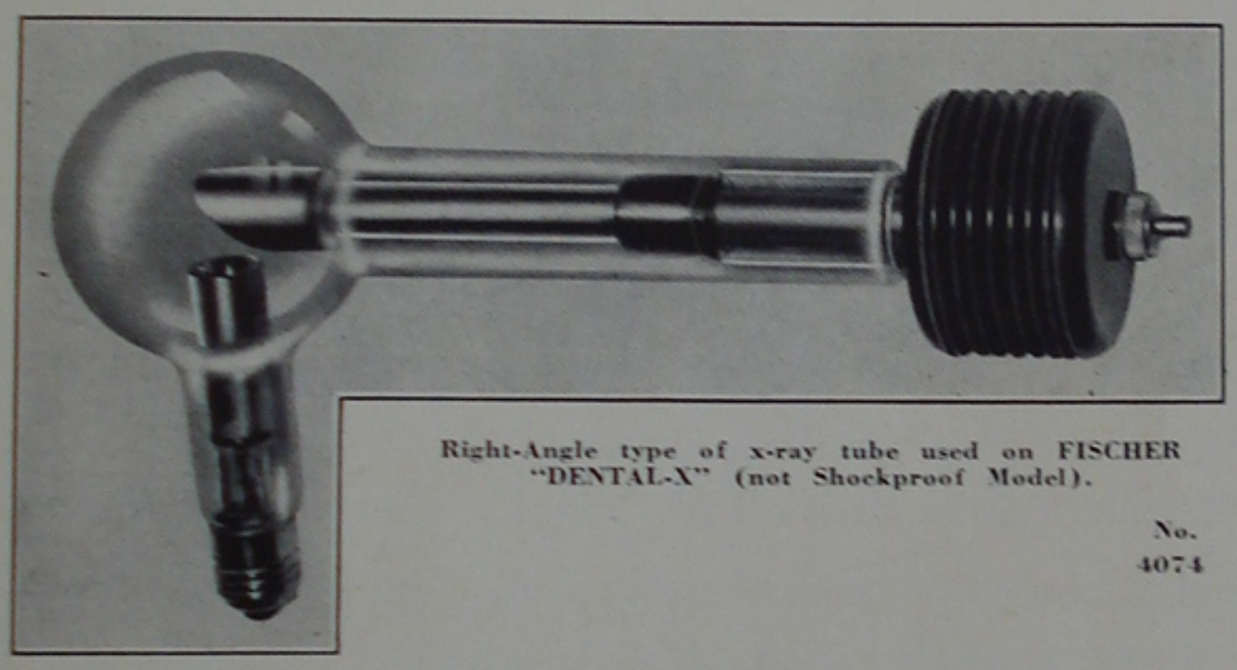
FISCHER Line-Focus Hot Cathode X-Ray Tubes



Type of x-ray tube used on 60 M.A. and 100 M.A. FISCHER Apparatus.



Type of x-ray tube used on FISCHER "DSP-20" and SHOCKPROOF "DENTAL-X".



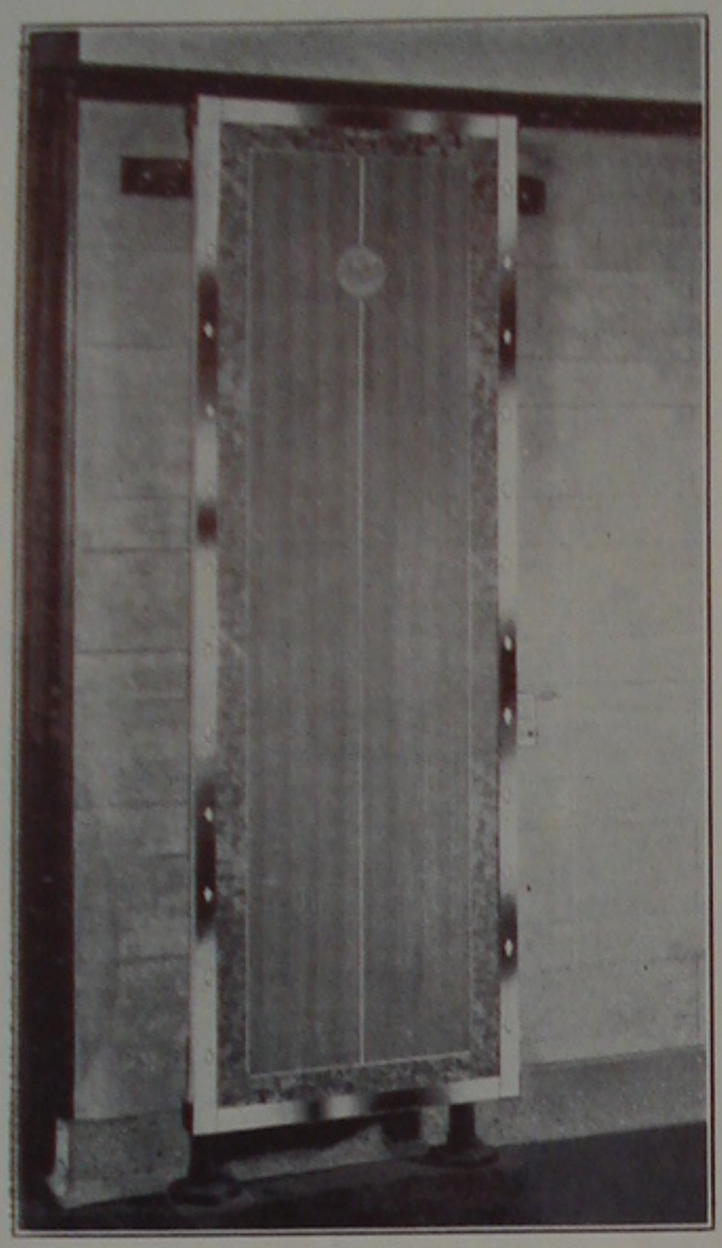
Right-Angle type of x-ray tube used on FISCHER "DENTAL-X" (not Shockproof Model).

FISCHER line-focus x-ray tubes offer the distinct advantage that greater energies may be used on the focus (designed for sharp definition) than can be used on a round focus of equal projected area. The tungsten target is cast-welded to an unusually large volume of pure copper, making an anode of great heat storage capacity. An efficient radiator is closely fitted to the anode shank and provides rapid radiation of heat from the anode, fitting these tubes for serial radiography. Special glass of low filtration value, tested free of strain flaws, is used for the bulb and stems of the tubes and all seals of metal to glass are carefully made to provide strength and freedom from leakage. The metal terminals are degassed before they are built into the tube and the final exhaust is performed with care and checked by gauges that insure tubes free from every trace of gas.

FISCHER tubes operate silently and accept heavy loads with no evidence of tube distress. They operate with a stability and a constancy of x-ray output that has never been excelled. Due to excellence of design, careful construction and low overhead costs, quality tubes are offered and priced below competition.

No.	●	CODE
2917	Right Angle "DENTAL-X" Tube (non-shockproof), 1.5 MM focal spot, 70,000 heat unit capacity—offers exceptionally fine definition in dental radiography	HOTRI
2921	"Radiographic-Fluoroscopic Tube". 2 MM focal spot, 100,000 heat unit capacity—combines excellent definition and radiographic speed—usable with all FISCHER 60 M.A. x-ray units	OAKIE
2922	"Radiographic-Fluoroscopic Tube". 3.5 MM focal spot, 100,000 heat unit capacity—permits the heavier loads required in speed radiography of the heart, lungs, etc. Usable with all FISCHER 60 M.A. x-ray units	OAKUM
2923	"Radiographic-Fluoroscopic Tube". 4.8 MM focal spot, 100,000 heat unit capacity—especially suited for long focal-film distances as encountered in radiography of the heart, lungs, 14″x36″ postural films, etc.—usable with all FISCHER 60 M.A. x-ray units	OARIA
3660	"Radiographic-Fluoroscopic Tube". 2 MM focal spot, 70,000 heat unit capacity—combines both excellent definition and speed, especially in bone radiography—may be used with "DSP-20" or "SP-DX" x-ray units	TREPA
3661	"Radiographic-Fluoroscopic Tube". 2.8 MM focal spot, 70,000 heat unit capacity—answers the need of the average physician doing general radiography and should be ordered with the "DSP-20" when a large amount of fluoroscopy will be in prospect	YAADE
3863	"Fluoroscopic Tube". 2 MM focal spot, 100,000 heat unit capacity—offers excellent fluoroscopic definition and was furnished with No. 3860 Fluoroscopic	YAGGO
3930	"Radiographic Tube". 1.5 MM focal spot, 70,000 heat unit capacity—offers excellent definition in bone and dental radiography and may be used with either "DSP-20" or "SP-DX" units	SACSS

No.	●	CODE
4074	"Radiographic-Fluoroscopic Bi-Focal Tube". 2 MM and 3.5 MM focal spots, 100,000 heat unit capacity—provides by use of the two focal spots, excellent definition in both bone and soft tissue radiography—for use with FISCHER 60 M.A. x-ray units	TAMOP
4075	"Radiographic-Fluoroscopic Bi-Focal Tube". 2 MM and 4.8 MM focal spots, 100,000 heat unit capacity—combines excellent bone definition with speed radiography of the heart, lungs, etc.—may be used with FISCHER "100-100" and 60 M.A. x-ray units	TAIOM
4077-Q	"DENTAL-X" Tube—SAME AS NO. 2917	TAMSA
4078	"Radiographic-Fluoroscopic Bi-Focal Tube". 2 MM and 3.5 MM focal spots, 200,000 heat unit capacity—same tube as No. 4074 except that it has twice the heat unit capacity of No. 4074 and should be used in laboratories that will have an exceptional amount of radiographic and fluoroscopic work	TAOMM
4079	"Radiographic-Fluoroscopic Bi-Focal Tube". 2 MM and 4.8 MM focal spots, 200,000 heat unit capacity—same tube as No. 4075 except that it has twice the heat unit capacity of the No. 4075 and should replace the No. 4075 where the laboratory will have an unusual amount of radiography and fluoroscopy	TAOMO
4128	"Radiographic Tube". 2 MM focal spot used in our Model "H" x-ray and should be ordered as a replacement for this unit	TAMYX
4129	"Radiographic-Fluoroscopic Tube". 2 MM focal spot—used in our Model "G" x-ray unit and should be ordered as a replacement for this unit	TATHI
4607	Radiographic-Fluoroscopic Tube with double focal spots, 1.5 MM and 4.8 MM. (Type 4-12 SP-IK) mounted in special Fischer oil immersed head with 9½ ft. shockproof cables. 350,000 heat unit capacity—as used with Fischer Catalog No. 4600 Model "100" Shockproof X-ray Apparatus and Fischer Catalog No. 4604 Model "100-96" Shockproof X-ray Apparatus	TIOBS



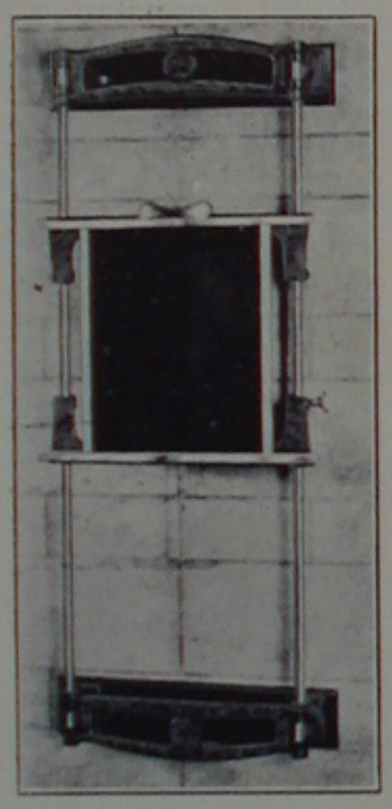
FISCHER Vertical Wall Frames

(with Bucky Diaphragm)

A special frame with or without Bucky to be used with any x-ray apparatus for making radiographs of any part of the body, with the patient in the vertical position. The flat type Bucky diaphragm used with this frame will accommodate any size film, either in plain holder or in cassette with intensifying screens, up to and including 14″ x 17″—a 36″ Bucky available if desired. Bucky may be lowered nearly to floor or may be raised to the height of the tallest patient. May be instantly clamped in any desired position. This accessory will prove particularly valuable in x-raying the chest or spine. Radiographs of the stomach and colon must often be made in the vertical position. This position must also be used to show the lateral seventh cervical vertebra. Frame is made of steel, chromium plated. Panel is of masonite. Adjustable head supports, as shown in the small illustration, will be found listed on page 28.



No.		Code
3528	Vertical wall frame for No. A4061 (17″) Bucky	TARTT
3529	Vertical wall frame for No. A4063 (36″) Bucky	TARVW
3530	Vertical wall frame with No. A4061 (17″) Bucky	TARWX
3531	Vertical wall frame with No. A4063 (36″) Bucky	TARXY



FISCHER Wall-Mounted Cassette Holder

EQUIPPED with removable panel, permitting change of cassette without disturbing patient. Can be adjusted for height and for size of cassette. Accommodates cassettes up to 14″ x 17″. A feature is the special chin rest. Finish is black kristokrak and chromium. Mounting boards are available.



No.		Code
4130	FISCHER Wall-Mounted Cassette Holder	TAOED
4131	Mounting Boards for above No. 4130	TAOPP

FISCHER-BENTSON X-Ray Film Filing Cabinets

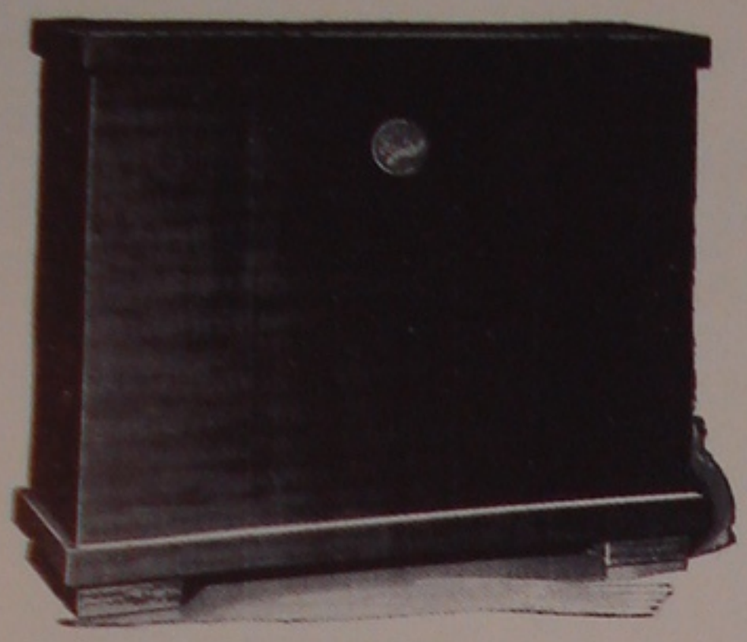
THE cabinet is rigidly re-enforced with all corners and connecting parts acetylene and electrically welded. Drawers operate on cradle-type, ball bearing progressive suspension slides, rolling easily and quietly despite heavy loading. Slides are cadmium-plated to prevent rusting. A re-enforced, positive locking and easily adjustable side locking follower block is furnished in each large film filing drawer. An automatic drawer catch is furnished on each large drawer (not supplied on small, temporary drawer), automatically locking the drawer when closed until released by the use of a bronze thumb latch, conveniently located near to the drawer pull.

All cabinets are equipped with louvers in the back, allowing a sufficient current of air to circulate throughout the entire inner capacity. This feature is an essential safeguard and complies with the increasing demand for such an arrangement, and with state law.

Standard finish is olive green baked enamel with beautiful grained finishes in mahogany and walnut furnished at low additional cost. Inside dimensions, 17-11/15″ x 15″ x 25½″.



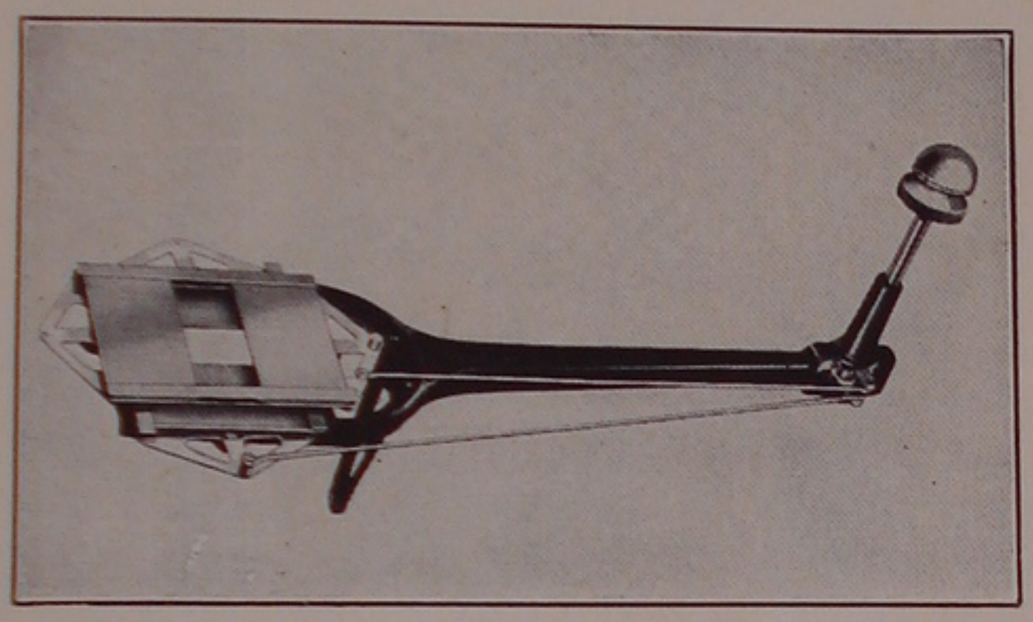
No.		Code
3200	Three Large Drawers with Shallow Drawer at Top—Olive Green	BEONE
3198	Same as No. 3200 with General Lock	TIBBC
3202	Two Large Drawers with Shallow Drawer at Top—Olive Green	BETRE
3199	Same as No. 3202 with General Lock	TIBCB
3203	One Large Film Drawer	TIBDC
3204	Same as No. 3203 with Individual Lock	TIBED



FISCHER Film Storage Cabinets

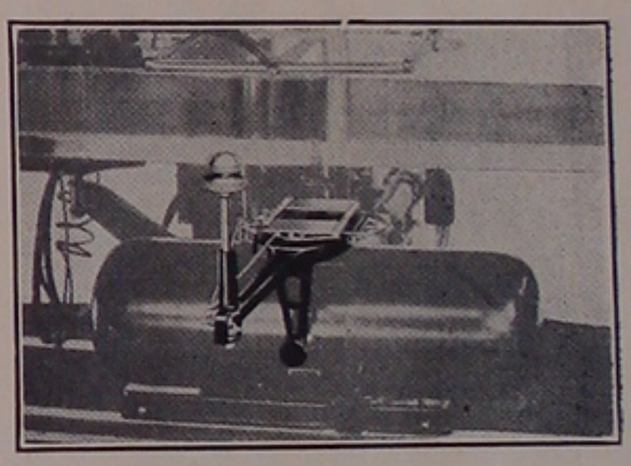
All FISCHER Film Storage Cabinets are carefully constructed and lined with heavy sheet lead. Joints are carefully sealed, and nail and screw holes are soldered over to prevent any possible chance of the x-rays leaking into the contents. The lead on the cover is pressed out to insure a snug fit into the cabinet, and reinforced to protect it from sagging. Nos. 573 and 575 are finished in mahogany, No. 3730 in black. No. 577A in black Kristokrak. Made in four sizes.

No.		Code
573	For Dental Films, size 4″ x 5″	DUNOT
575	For Films up to and including size 8″ x 10″	DENSO
577A	For Films up to and including size 14″ x 17″	TASBB
3730	For Films up to and including size 14″ x 36″	TAMAT



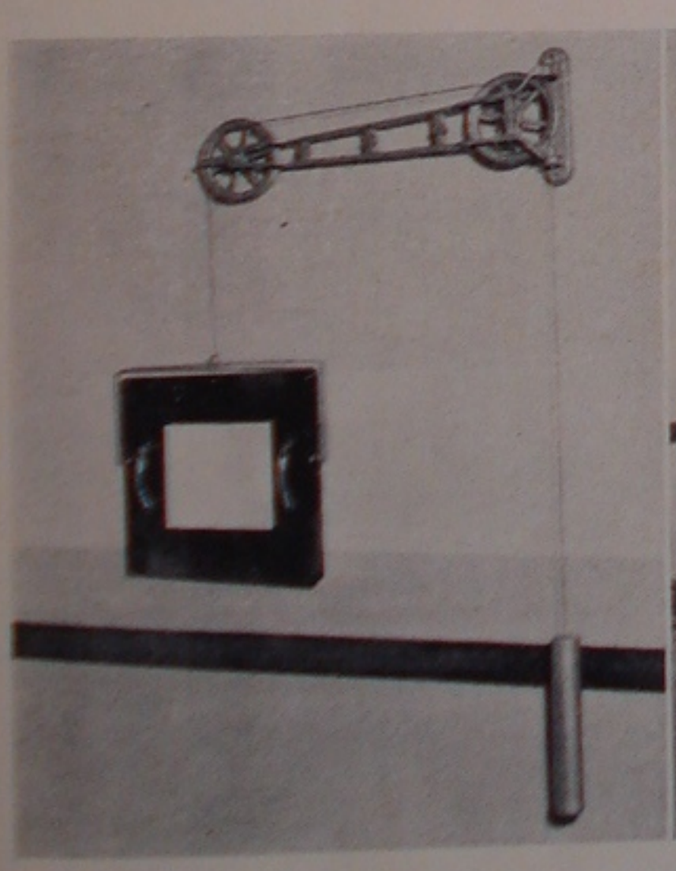
FISCHER Localizing Fluoroscopic Shutter Attachment

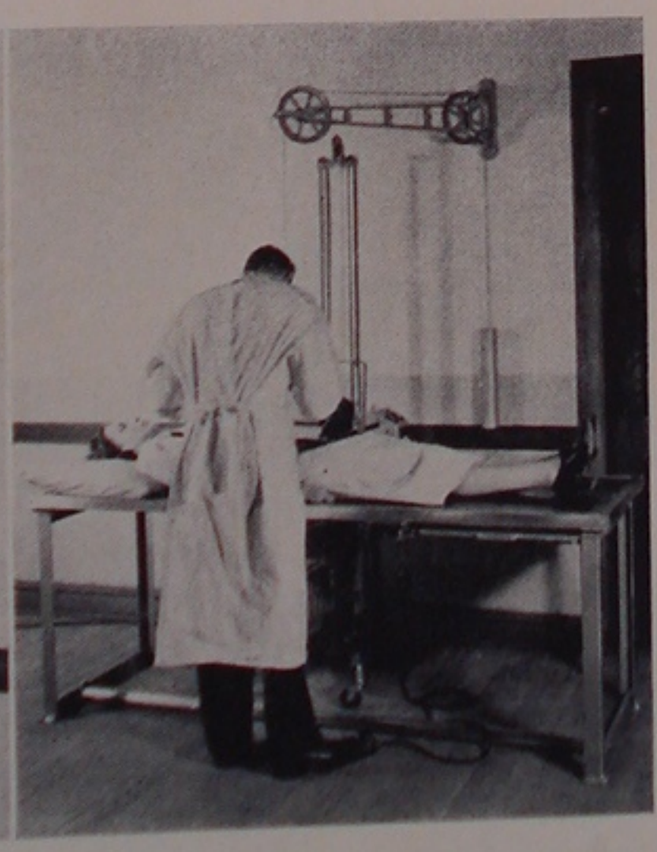
Attaches and detaches automatically. Greatly facilitates fluoroscopic work. The two control knobs are conveniently located, making for ease of operation. Designed to fit the FISCHER "60-88" Diagnostic, Shockproof X-Ray Apparatus and to attach or detach at will. No tools are required. It simply slips into the grooves provided on the metal x-ray tube cover for holding the compression cones or aluminum filters. Any size opening, square or rectangular, from zero up to full size of the fluoroscopic screen is obtainable. The illustrations show the shutter itself and position in operation. Weight of shutter, 6 lbs. The adjustable shutters are of heavy sheet lead, supported by sheet steel. The frame is aluminum. The finish black enamel or ivory and plating to match the finish of FISCHER Model "60-88." A unique counterweighting device in the upright support offsets the added weight of the shutter attachment and leaves the whole unit perfectly counterbalanced.



No.		Code
2927	FISCHER Localizing Fluoroscopic Shutter Attachment	KAYLE

FISCHER Counterbalanced Fluoroscopic Screen with Wall Mounting



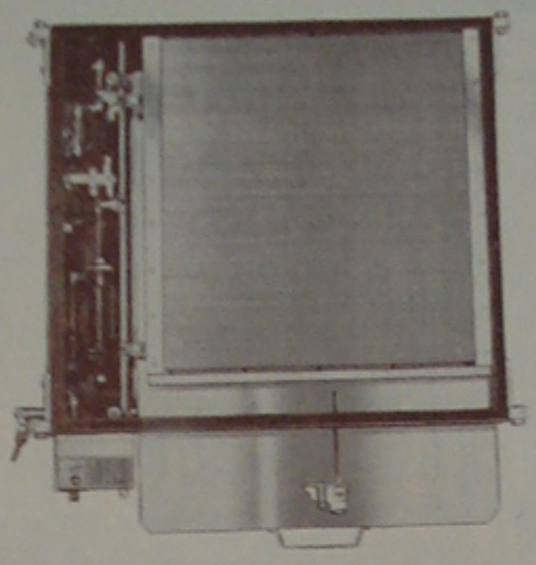


THIS unit consists of an 8″x10″ Patterson Type "B" Fluoroscopic Screen, mounted with lead glass protection, including a 5″ wide lead protective border or frame, supported by cable and counterbalance over wall swivel hanger, as shown in the illustration. The screen is so counterbalanced as to move at a touch. Standard finishes are black kristokrak and hammered gray. In use, this screen obviously serves in either vertical or horizontal fluoroscopy.

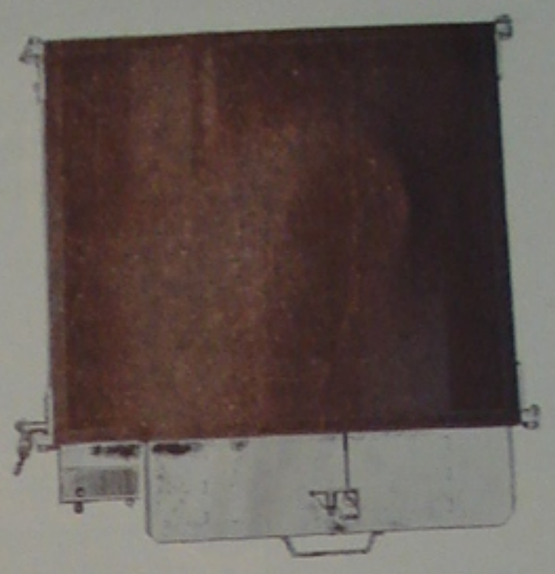
No.		Code
4462	FISCHER Counterbalanced Fluoroscopic Screen (8″ x 10″) with Wall Mounting	TIKYD
4463	FISCHER Counterbalanced Fluoroscopic Screen (10″ x 12″) with Wall Mounting	TILRO

FISCHER Synchrotimed Bucky—17" and 36"

DESIGNED with new style of oil control in motor, to provide smoother movement. No jumps—movement perfectly uniform. Also a novel way of timing with chart—Bucky can be set for any desired exposure. Virtually eliminates the possibility of grid marks. *The following numbers are timed .5 sec. to 25 sec.*



Bucky as used in x-ray table.



Bucky with covering for use anywhere.

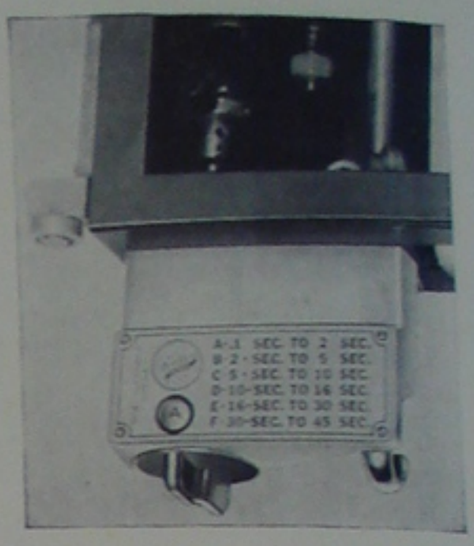
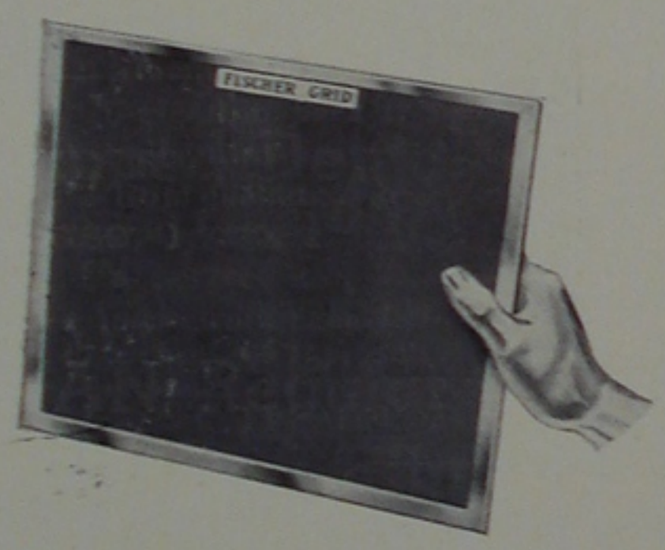


Illustration showing detail of controls.

No.		Code
A4058A	17" FISCHER Flat Synchrotimed Bucky Diaphragm with bakelite top	TIDHF
A4059	17" FISCHER Flat Synchrotimed Bucky Diaphragm to fit "DS-60" Apparatus	TIDIG
A4060	17" FISCHER Flat Synchrotimed Bucky Diaphragm to fit Tilt Table when used with "60-88" unit	TIDJH
A4061	17" FISCHER Flat Synchrotimed Bucky Diaphragm to fit No. 3532 Table as used with "DSP-20" and "SP-60" units	TIDKI
	17" FISCHER Flat Synchrotimed Bucky Diaphragm to fit Vertical Wall Frame No. 3529	TIDOM
A4055	36" FISCHER Flat Synchrotimed Bucky Diaphragm	TIDMK
A4063	FISCHER Flat Synchrotimed 36" Bucky Diaphragm	TIDPN
A4056	FISCHER Flat 36" Synchrotimed Bucky to fit Tilt-Table No. 4035	

The same numbers as above WITHOUT THE PREFIX "A" are timed 1 sec. to 45 sec.

Radiographic and Fluoroscopic Grids



WHILE the Bucky diaphragm remains the best known method of absorption of secondary radiation, there are times when the cost, size and weight of the Bucky diaphragm makes its use prohibitive, especially in small laboratories, small offices and at the bed-side. In such cases, the use of a radiographic grid is recommended in radiography. Radiographs of patients taken through a radiographic grid, compared to non-bucky, non-grid films, show remarkable contrast and clearness of definition.

The fluoroscopic grid is very similar in appearance, thickness and general design to the radiographic grid. The fluoroscopic grid is mounted to the back of the regular fluoroscopic screen mounting and like the radiographic grid its function is the absorption of secondary radiation, thereby creating a sharper and clearer fluoroscopic image.

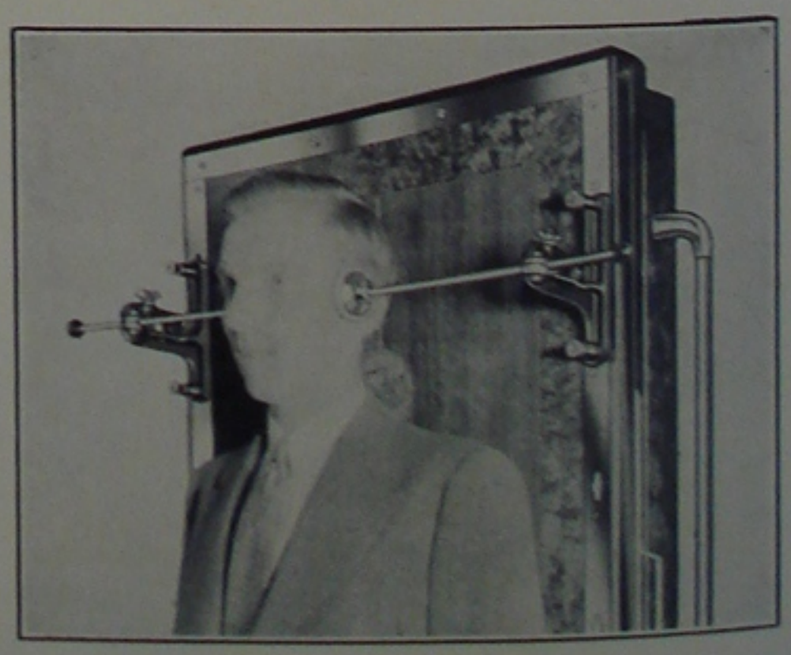
No.		Code
4558	12" x 16" Fluoroscopic grid	TIKDZ
4559	14" x 17" Radiographic grid	TIKEY
4560	11" x 14" Radiographic grid	TIKFX
4561	10" x 12" Radiographic grid	TIKGW
4562	8" x 10" Radiographic grid	TIKHV
4563	5" x 7" Radiographic grid	TIKIT

Nos. 4558, 4559 and 4562 carried in stock.

Immobilizing Supports for FISCHER Tilt Table

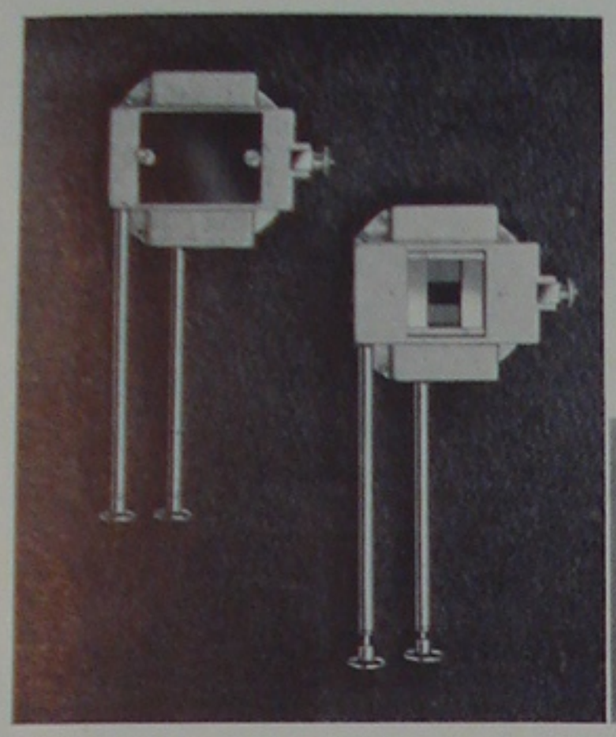
Immobilizing Supports for FISCHER Tilt Table designed to fasten to FISCHER Tilt Table and to immobilize head or other parts of body. Can be set in any of the positions on Tilt Table. The arms are adjustable. Fits also FISCHER Wall Frame. See illustration on page 26.

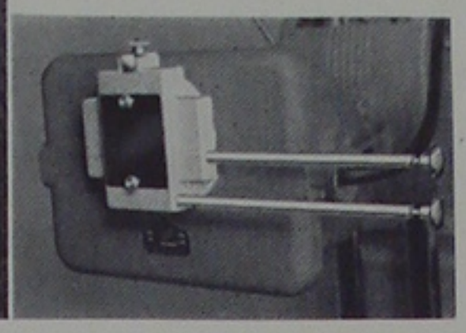
No.		Code
4037	Immobilizing Supports especially adapted to FISCHER Tilt-Table	TAIGH



FISCHER Fluoroscopic Shutter

For use on all FISCHER Shockproof X-Ray Apparatus having "T" and "G" tubeheads.

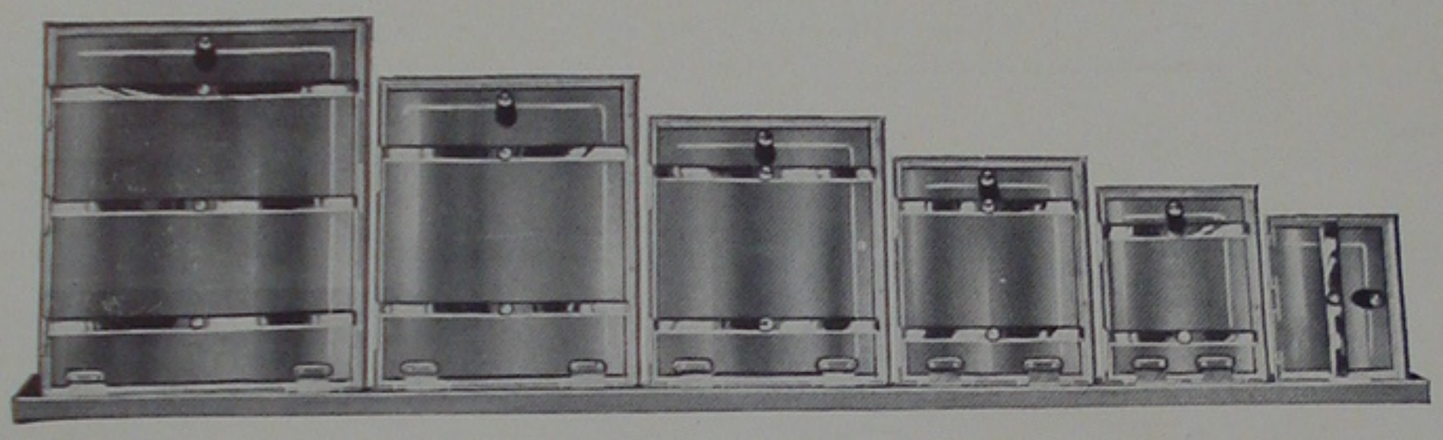




THIS shutter is compact and light in weight. It has an adapter that screws tightly into the threads that are used to hold the cone. Thus it can be attached quickly and as quickly and easily removed. There is a swivel in the shutter that permits setting the extension arms, supporting the two controls, at any desired angle or position. The shutters themselves are heavy lead, adjustable for any limitation of screen area. Operation is very simple and convenient.

No.		Code
4608	FISCHER Fluoroscopic Shutter	TILGX

BUCK Stainless Steel Frame Cassettes



Experience in the manufacture of many thousands of cassettes with cast aluminum frames has brought out certain defects in this type of cassette, which it has been our aim to overcome in the new Buck steel frame cassette. Note the following points:

The hollow steel frame has welded corners, impossible to break, and the method of manufacture insures a true alignment free from stress. *Contact*—These cassettes eliminate any uncertainty of screen and film contact. *Light Weight*—Weight reduced to a noticeable extent. *Cover*—A recess around the four edges of the cover allows for the thickness of tape used in mounting screens. This promotes contact. If necessary to remove the cover screen from the felt, tape has a decided advantage. *Hinges*—Wide metal hinges prevent damage to screens when properly mounted on the cassette cover. *Springs*—The alignment of the cassette is so nearly perfect as to require only gentle pressure to produce contact, increasing life of the screens. *Felt*—A special manufacture practically free from lint or shedding. *Made with Aluminum front or Bakelite front. Aluminum front recommended where there is excessive humidity.*

WITH ALUMINUM FRONT

No.		Code
4715	5″ x 7″ Cassette	TIOKF
4716	6½″ x 8½″ Cassette	TIOEH
4717	8″ x 10″ Cassette	TIOFI
4718	10″ x 12″ Cassette	TIOGJ
4719	11″ x 14″ Cassette	TIOHL
4720	14″ x 17″ Cassette	TIOJM
4721	14″ x 36″ Cassette	TIOPR

WITH BAKELITE FRONT

No.		Code
4725	5″ x 7″ Cassette	TIOTT
4726	6½″ x 8½″ Cassette	TIOVX
4727	8″ x 10″ Cassette	TIPAC
4728	10″ x 12″ Cassette	TIPCA
4729	11″ x 14″ Cassette	TIPBD
4730	14″ x 17″ Cassette	TIPDB
4731	14″ x 36″ Cassette	TIPEF

(Special sizes, price on application)

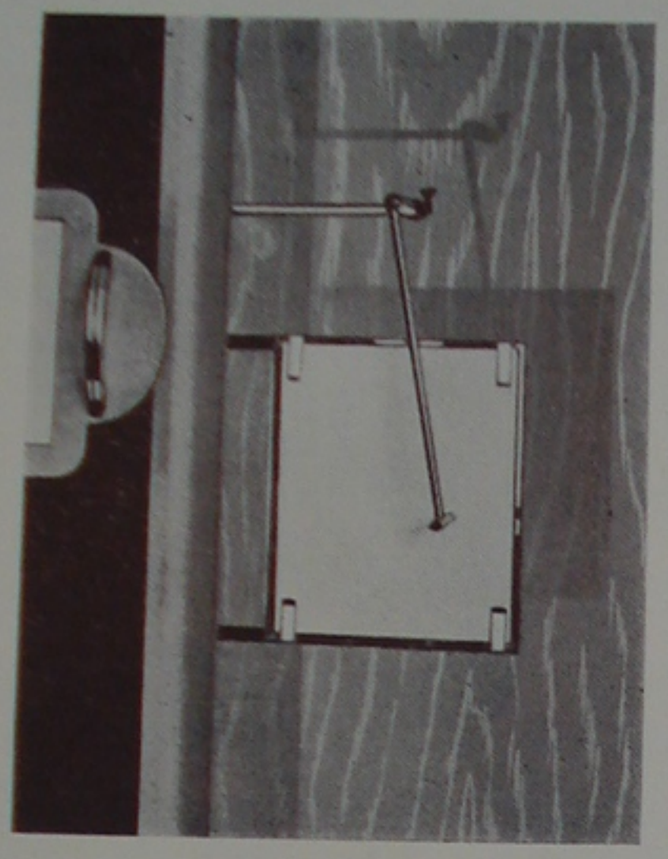
EASTMAN
X-Ray Exposure Holders



These holders offer a convenient and satisfactory method of handling x-ray film during exposure. They eliminate trouble in loading the usual black and orange envelopes. The hinged cardboard with the orange envelopes securely fastens with metal clips and permits the film to be handled with greater convenience during exposure. The holders are well made and with ordinary care will last for a considerable time. They are lead backed.

No.				Code
1678	5″	x 7″	(lead-backed) Exposure Holder	LADLE
1679	6½″	x 8½″	(lead-backed) Exposure Holder	LAGOO
1680	8″	x 10″	(lead-backed) Exposure Holder	LADDE
1681	10″	x 12″	(lead-backed) Exposure Holder	LAGUN
1682	11″	x 14″	(lead-backed) Exposure Holder	LABEL
1683	14″	x 17″	(lead-backed) Exposure Holder	LABIA

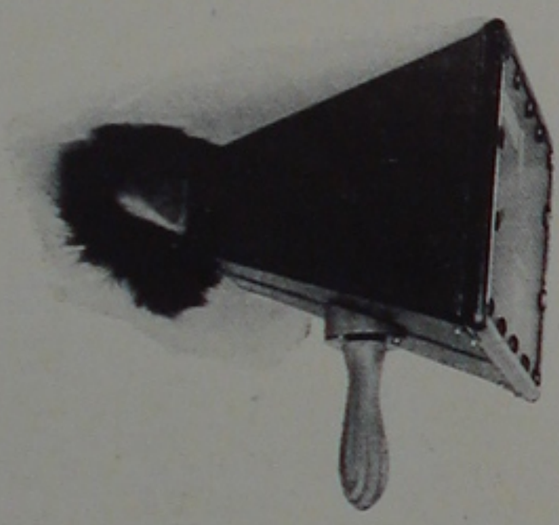
FISCHER Orthodiagraphic Attachment



AN accessory for use with FISCHER Model "GF", also FISCHER Model "TF" apparatus, which permits tracings of the heart to be made, true as to size and shape. Thus permanent records can be kept. This attachment consists of three parts, first, a crosswire sight; second, a recording arm; and third, a tracing board. All three parts may be attached to the frame of the x-ray apparatus or detached easily and quickly. The tracings are made on paper sheets which clamp to the tracing board. For simplicity, accuracy and convenience, this attachment is remarkable.

No.		Code
4360A	FISCHER Orthodiagraphic Attachment	TIJWD

FISCHER Hand Fluoroscopes



Consists of a handsome black box, with heavy roll of felt around eye piece, making it absolutely light proof, and with the latest Patterson Type "B" super-sensitive fluoroscopic screen. Materials and workmanship are highest quality.

No.		Code
1020BA	5″ x 7″ Patterson Type "B" Super-sensitive Screen, mounted in light proof box	TIGRO
1024BA	5″ x 7″ Patterson Type "B" Super-sensitive Screen, mounted in light proof box with lead glass protection over entire screen	THIOS
1025BA	5″ x 7″ Patterson Type "B" Super-sensitive Screen, mounted in light proof box with lead glass protection over entire surface and heavy sheet lead hand protector	THIRT
1026BA	8″ x 10″ Patterson Type "B" Super-sensitive Screen, mounted in light proof box with lead glass protection over entire surface and heavy sheet lead hand protector	THIUR

PATTERSON Operating Fluoroscopes



Leatherette covering. Held in place before the eyes with elastic bands, as illustrated. Permits operator to use both hands. When the operator does not desire to use screen, box containing screen may be tilted back against the head. When the box is so tilted a piece of ruby glass automatically falls down in front of the eye piece, protecting the accommodation of the eyes. Equipped with latest Patterson Type "B" super-sensitive screen.

No.		Code
1031B	Operating Fluoroscope, equipped with 5″ x 7″ Patterson Type "B" super-sensitive Screen and heavy lead glass protection	TIPFO

PATTERSON Standard Unmounted Fluoroscopic Screens

The following numbers of Patterson Standard Fluoroscopic Screens are types universally used throughout the country, and have proven eminently satisfactory. The fluorescent salt employed in their manufacture is not affected by ordinary heat or dampness, and if properly mounted in a suitable frame and handled with ordinary care, will render good service for many years.

No.		Code
1021	Patterson Standard, 5″ x 7″, Screen only	DRENC
1022	Patterson Standard, 8″ x 10″, Screen only	DUCTO
1023	Patterson Standard, 10″ x 12″, Screen only	DULCI
1017	Patterson Standard, 11″ x 14″, Screen only	DUTCH
1018	Patterson Standard, 12″ x 16″, Screen only	DYADE
1019	Patterson Standard, 14″ x 17″, Screen only	DYNEZ

PATTERSON "Type B" Fluoroscopic Screens

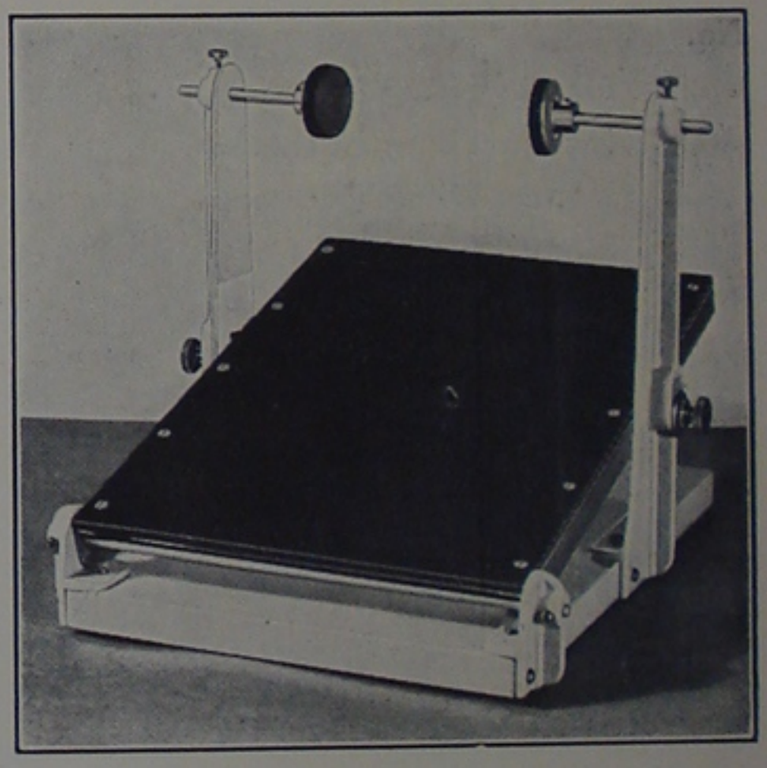
The Patterson Type "B" represents the latest development in fluoroscopic screens and is rapidly supplanting the older type Patterson Standard. The Type "B" fluoresces with a brilliant yellow-green color which is pleasing and restful to observe and a color to which the eye readily accommodates. The sensitivity of the screen permits low operating intensities thereby giving excellent detail and contrast.

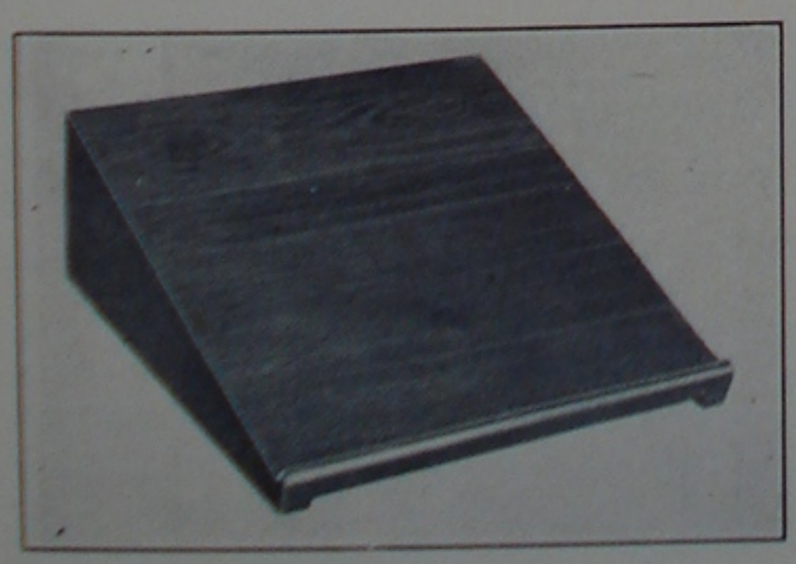
No.	Patterson "Type B" Fluoroscopic Screen only	Code
3440	5″ x 7″	GNASI
3441	8″ x 10″	GLENA
3442	10″ x 12″	GRAPE
3443	11″ x 14″	GREGO
3444	12″ x 16″	GROAT
3445	14″ x 17″	GROVE

FISCHER Adjustable Head Rest and Cassette Holder

Designed to accommodate 8″x10″ cassette. Changes from sinus to mastoid positions. Any position locks fast. The head supports are adjustable. Top is tempered prestwood. Finish ivory.

No.		Code
3549	FISCHER Adjustable Head Rest and Cassette Holder	JEDRO



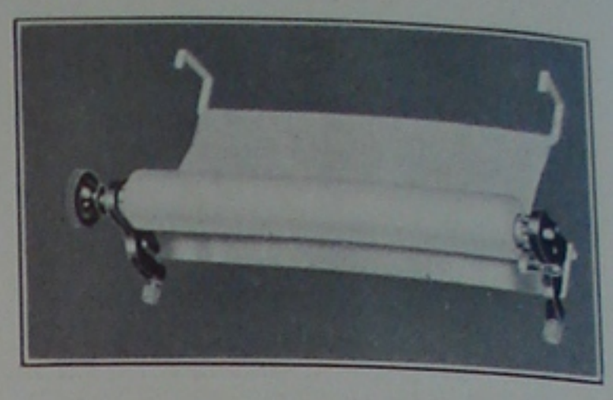


FISCHER Angle Block Head Support

Arranged so that either the 34° or 37° angle may be employed for mastoid frontal sinus and similar radiographic work. All wood construction, mahogany finish. Has ledge at bottom to hold cassette or film holder in place. Dimensions 12″ by 13″. Proper angular support for head or skull negatives is an absolute necessity if the best results are to be obtained.

No.		Code
3547	FISCHER Angle Block Head Support	FACIO

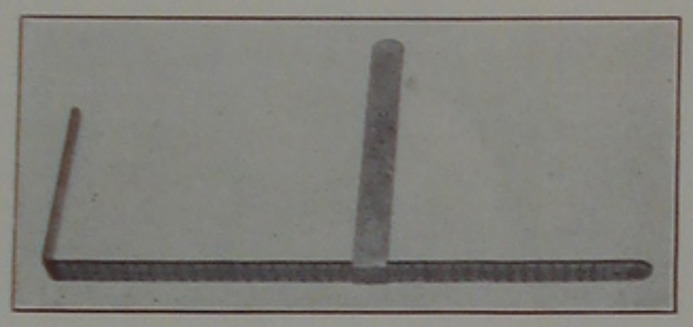
FISCHER Immobilizing and Compression Attachment



Specially designed, convenient immobilizing band, made of woven, non-stretching material (linen pocket-drill), 10 inches wide. The frame is arranged with a ratchet and locking device which holds band tight over patient. Equally serviceable with tables or wall frames.

No.		Code
3496A	FISCHER Immobilizing and Compression Attachment for FISCHER Tables, or Vertical Wall Frame	OXYAC
3495A	FISCHER Double Immobilizing and Compression Attachment for FISCHER Tables or Upright Wall Frame	FLATT
3492A	Immobilizing Band only	FLOOD

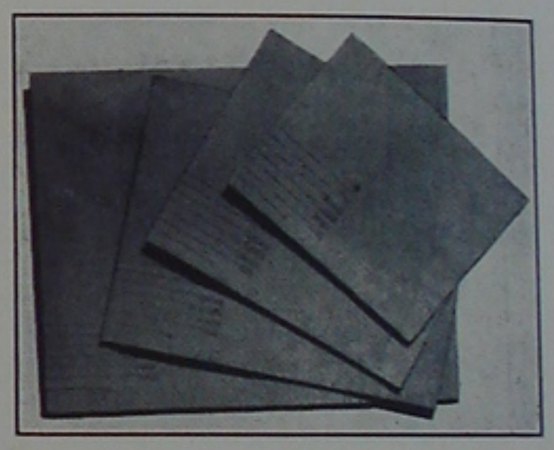
FISCHER Thickness-of-Part Caliper



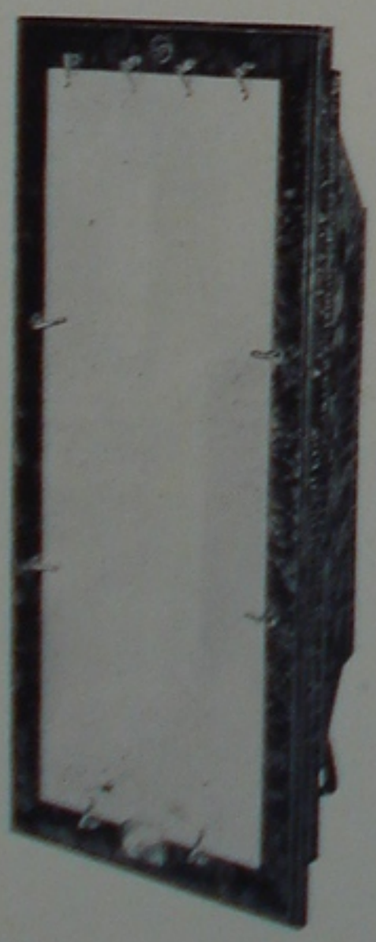
This caliper is made of aluminum, highly polished and is of the right angle type calibrated from 1 to 40 Centimeters; it provides the most exact method known today for the determination of the P.K.V. necessary to compensate for the increased or decreased thickness of any part of the body to be radiographed.

No.		Code
4364	FISCHER Thickness-of-Part Caliper	TEBUX

Negative Preservers (Filing Envelopes)



No.		Code
1650	Manila Filing Envelopes, 5 " x 7 " size, per 100	FOVEA
1651	Manila Filing Envelopes, 6½" x 8½" size, per 100	FRAXX
1652	Manila Filing Envelopes, 8 " x 10 " size, per 100	FRETT
1653	Manila Filing Envelopes, 10 " x 12 " size, per 100	FROST
1654	Manila Filing Envelopes, 11 " x 14 " size, per 100	FOCUS
1655	Manila Filing Envelopes, 14 " x 17 " size, per 100	FUNDA



FISCHER Special Illuminator 14"x36" Films

AVERY attractive and necessary unit for illuminating 14" x 36" films. The attractive frame is in black Kristokrak. Blue opal glass is used at front with a clear glass baffle behind and slot at top for conducting heat. Films are held in position by 10 clips properly placed for convenience and effectiveness. Three 150-watt Daylight (inside frosted) bulbs are used—included in the price, also connecting line cord. A stable base permits setting illuminator in position for best observation.

No.		Code
3736	FISCHER Special Illuminator for 14" x 36" Films including three 150-watt Daylight (inside frosted) bulbs	TIBRY

X-RAY INTENSIFYING SCREENS

Intensifying screens are an absolute requirement in the roentgenographic laboratory. They make it possible to produce negatives of the heavier parts in one-fourth to one-fifth the time required where they are not used. This means much less strain on the x-ray tube, as well as less consumption of line current. For the benefit of users, all the better known brands of intensifying screens are listed.

BUCK Non-Halation Intensifying Screens

Present-day radiography uses screens of different speeds in order to secure the best possible results. For this reason, many x-ray laboratories, in addition to screens of medium speed and definition, require special screens where greater speed or better definition is the objective. Buck, Non-Halation Intensifying screens come in three types — X-TRA Speed Brand, MID Speed Brand, and DEFINITION Brand.



Buck X-TRA Speed Brand represents the ultimate speed possible consistent with good detail.

Buck MID Speed Brand is an "all-purpose" screen.

Buck DEFINITION Brand is for use where the "ultimate" in definition is desired.

No.	Buck X-TRA-SPEED Intensifying Screen Code
3795	5" x 7".....Pair TOMEN
3796	6½" x 8½"....Pair TOMOY
3797	8" x 10".....Pair TOMTO
3798	10" x 12".....Pair TONAP
3799	11" x 14".....Pair TONGA
3800	14" x 17".....Pair TONIK
3803	14" x 36".....Pair TONZE

No.	Buck MID-SPEED Intensifying Screen Code
3804	5" x 7".....Pair TOPAN
3805	6½" x 8½"....Pair TOPTA
3806	8" x 10".....Pair TOPES

No.	Buck MID-SPEED Intensifying Screen Code
3807	10" x 12".....Pair TOPHI
3808	11" x 14".....Pair TOPSY
3809	14" x 17".....Pair TOPOR

No.	Buck DEFINITION Intensifying Screen Code
3813	5" x 7".....Pair TORAM
3814	6½" x 8½"....Pair TOROG
3815	8" x 10".....Pair TORRE
3816	10" x 12".....Pair TORSH
3817	11" x 14".....Pair TORPI
3818	14" x 17".....Pair TORIC

The above prices cover combinations or pairs.

Single thick screen, 60% of Combination price. Single thin screen, 40% of Combination price.

EASTMAN Ultra-Speed Intensifying Screens

Eastman Ultra-Speed Intensifying Screens are available to meet the demands of modern radiography for short exposure or low kilovoltage technic. When used with Eastman X-Ray Films the time or the voltage factor can be reduced to the minimum established by present scientific knowledge. Freedom from grain and afterglow, durability, and ease in mounting are inherent characteristics of these new Eastman Screens. The intensifying material, coated on a cardboard support, presents a surface that will not readily abrade or scratch, and is easily cleaned. Eastman Ultra-Speed X-Ray Intensifying Screens are supplied in pairs; the front unit being thinner to prevent undue absorption of low voltage radiation. Mounting is easily accomplished in any type cassette, and the surfaces stay flat—there is no buckle or curl.

No.		Code
3225	Eastman, 5 " x 7 ", Pair. Eastman Ultra-Speed Intensifying Screens	ODORI
3226	Eastman, 6½" x 8½", Pair. Eastman Ultra-Speed Intensifying Screens	ODYNO
2477	Eastman, 8 " x 10 ", Pair. Eastman Ultra-Speed Intensifying Screens	ZIDUF
2478	Eastman, 10 " x 12 ", Pair. Eastman Ultra-Speed Intensifying Screens	ZEVAM
2479	Eastman, 11 " x 14 ", Pair. Eastman Ultra-Speed Intensifying Screens	ZECWO
2480	Eastman, 14 " x 17 ", Pair. Eastman Ultra-Speed Intensifying Screens	ZECZY

PATTERSON Intensifying Screens

Patterson screens cover the entire ranges of radiography. Whatever the size of the apparatus, whatever the demands of the roentgenologist, one of these Patterson screens is especially suited to that condition.

Hi Speed .....for maximum speed with any capacity apparatus.

Par Speed .....represents the ideal balance between speed and detail in effect a fast detail screen.

No.	•	Code
2860	Patterson "Par-Speed," 8" x 10", Thin	PABUL
2861	Patterson "Par-Speed," 8" x 10", Thick	PACAL
2862	Patterson "Par-Speed," 8" x 10", Pair	PACHA
2863	Patterson "Par-Speed," 10" x 12", Thin	PACIF
2864	Patterson "Par-Speed," 10" x 12", Thick	PADLE
2865	Patterson "Par-Speed," 10" x 12", Pair	PAEAN
2866	Patterson "Par-Speed," 11" x 14", Thin	PAGET
2867	Patterson "Par-Speed," 11" x 14", Thick	PAILO
2868	Patterson "Par-Speed," 11" x 14", Pair	PAJAM
2869	Patterson "Par-Speed," 14" x 17", Thin	PAKLO
2870	Patterson "Par-Speed," 14" x 17", Thick	PALAT
2871	Patterson "Par-Speed," 14" x 17", Pair	PALEY

No.	•	Code
2875	Patterson "High-Speed," 8" x 10", Thin	PALIZ
2876	Patterson "High-Speed," 8" x 10", Thick	PALMO
2877	Patterson "High-Speed," 8" x 10", Pair	PAMPA
2878	Patterson "High-Speed," 10" x 12", Thin	PANAC
2879	Patterson "High-Speed," 10" x 12", Thick	PANED
2880	Patterson "High-Speed," 10" x 12", Pair	PANJA
2881	Patterson "High-Speed," 11" x 14", Thin	PANSY
2882	Patterson "High-Speed," 11" x 14", Thick	PAPAW
2883	Patterson "High-Speed," 11" x 14", Pair	PAPUS
2884	Patterson "High-Speed," 14" x 17", Thin	PARAB
2885	Patterson "High-Speed," 14" x 17", Thick	PARCA
2886	Patterson "High-Speed," 14" x 17", Pair	PAROL

PATTERSON Fluorazure Intensifying Screens

The Fluorazure is a distinct type of intensifying screen and has its particular field in low kilovoltage technique. This screen is especially sensitive to soft radiation and at 30 P.K.V. is approximately three times as fast as the fastest high speed screen. It is recommended chiefly for radiography done at no more than 45 P.K.V. This speed characteristic makes it useful for low powered or portable units.



No.	•	Code
2850	Patterson Fluorazure Combination, 8" x 10", Pair	TENAX
2851	Patterson Fluorazure Combination, 10" x 12", Pair	TENLI
2852	Patterson Fluorazure Combination, 11" x 14", Pair	TENDE
2853	Patterson Fluorazure Combination, 7" x 17", Pair	TENRO
2854	Patterson Fluorazure Combination, 14" x 17", Pair	TENOT



EASTMAN X-Ray Film Corner Cutter

DESIGNED to eliminate the sharp or rough corners on x-ray films, caused by developing hanger clips. Prevents such corners scratching other radiographs. Consists of self-sharpening knife with protective guard. There are guard rails to hold radiograph so that a uniform cut is made from each corner. Several radiographs may be trimmed at one time.

No.	•	Code
4004	EASTMAN X-Ray Film Corner Cutter	TIBXY

X-RAY FILMS

In selecting x-ray films, there are certain points important to keep in mind. Naturally each type or brand of film has its own characteristics. One film, for instance, will operate best at one voltage, another film at a different voltage. Films react differently also in the processes of development. In dental work sometimes slow films may be wanted for greater detail; at other times the greatest speed is desirable. There is something to be said, further, for the operator's own experience. Using a certain brand of film, an operator may be getting entirely satisfactory results. Changing to another brand of films, and still using his old technic, may upset everything. Familiarity with the nature of a film is necessary. For convenience of customers we have listed different brands. (If you have difficulty with films, put your problem to us. We shall be glad to recommend the proper procedure.)



AGFA Non-Screen X-Ray Films

The Agfa Non-Screen X-Ray Film produces the maximum contrast and brilliancy ordinarily obtained only with intensifying screens, yet with an increase rather than a loss in detail. The speed of this film is approximately four times that of the regular film when used in exposure holders. The extreme latitude of this film will permit exposures of 50% above or below normal without disturbing the excellent diagnostic qualities. A maximum amount of soft tissue and bony detail is possible on the same film. It is a definite improvement in foreign body localization and soft tissue diagnosis, such as cancer of the throat and of the breast.

No.	•	Code
4145	5 ″ x 7 ″, 1 dozen package	TALII
4146	6½″ x 8½″, 1 dozen package	TALJJ
4147	8 ″ x 10 ″, 1 dozen package	TALIJ
4148	10 ″ x 12 ″, 1 dozen package	TALJI
4149	11 ″ x 14 ″, 1 dozen package	TALKK
4150	14 ″ x 17 ″, 1 dozen package	TALMM

No.	•	Code
4170	5 ″ x 7 ″, 6 dozen package	TAMHA
4171	6½″ x 8½″, 6 dozen package	TAMII
4172	8 ″ x 10 ″, 6 dozen package	TAMAI
4173	10 ″ x 12 ″, 6 dozen package	TAMIA
4174	11 ″ x 14 ″, 6 dozen package	TAOAB
4175	14 ″ x 17 ″, 6 dozen package	TAOCB

AGFA High-Speed X-Ray Films

The Regular Agfa X-Ray Film is very sensitive so that it gives full registration of detail on short exposures and has unusually wide range of gradation from clear white to dense black. The consistency of this film is superior to certain other films on the market so that a new technic chart is not necessary with every new box of films.

No.	•	Code
4135	5 ″ x 7 ″, 1 dozen package	TALDC
4136	6½″ x 8½″, 1 dozen package	TALEE
4137	8 ″ x 10 ″, 1 dozen package	TALEF
4138	10 ″ x 12 ″, 1 dozen package	TALGG
4139	11 ″ x 14 ″, 1 dozen package	TALHH
4140	14 ″ x 17 ″, 1 dozen package	TALGH

No.	•	Code
4178	5 ″ x 7 ″, 6 dozen package	TAOBA
4179	6½″ x 8½″, 6 dozen package	TAOCC
4180	8 ″ x 10 ″, 6 dozen package	TAOAC
4181	10 ″ x 12 ″, 6 dozen package	TAOCA
4182	11 ″ x 14 ″, 6 dozen package	TAMAO
4183	14 ″ x 17 ″, 6 dozen package	TAMOA

BUCK X-Ray Films

Speed with contrast, and freedom from chemical fog are the outstanding points of superiority. The process used in the manufacture of Buck X-Ray Films insures the making of a very uniform product. The silver bromide crystals are very fine, which aids in the registration of the most delicate detail. It develops and fixes freely, also resists to a considerable degree the softening effect of warm wash water—dries quickly. To manufacture a fast film which possesses good keeping quality requires the proper processing of the finest materials and complete elimination of foreign chemicals or matter by the use of the right kind of water for washing emulsions, and it is for this reason that Buck X-Ray Films give very little trouble from deterioration. *Safety Base.*



No.	•	Code
3315	5 ″ x 7 ″, 1 doz. box	ONCOS
3316	6½″ x 8½″, 1 doz. box	ONANO
3317	8 ″ x 10 ″, 1 doz. box	ONIER
3318	10 ″ x 12 ″, 1 doz. box	ONYCH
3319	11 ″ x 14 ″, 1 doz. box	OOCYT

No.	•	Code
3320	14 ″ x 17 ″, 1 doz. box	ONYXI
3321	7 ″ x 17 ″, 1 doz. box	OPACI
3322	8 ″ x 36 ″, 1 doz. box	OPAQU
3323	14 ″ x 36 ″, 1 doz. box	OMAZY

EASTMAN Ultra-Speed X-Ray Films

Eastman Ultra-Speed X-Ray Films are evolutionary products of continued scientific research to keep pace with radiographic progress. Their outstanding advantage is greater sensitivity, which makes possible the use of shorter exposures or less kilovoltage than has ever before been possible in radiography. Safety film solves the storage and filing problem because it complies with the most rigid fire regulation.

No.		Code
3300	5 " x 7 ", 1 doz. pkg.	OPHTH
3301	6½" x 8½", 1 doz. pkg.	OPIUM
3302	8 " x 10 ", 1 doz. pkg.	OPPIL
3303	10 " x 12 ", 1 doz. pkg.	OPSIM
3304	11 " x 14 ", 1 doz. pkg.	ORBIT
3305	14 " x 17 ", 1 doz. pkg.	ORCHI
3299	14 " x 36 ", 1 doz. pkg.	TACHE

BUCK Metal-Wrapped Dental Packets

(Safety Base, 1¼ x 1⅝ in.)

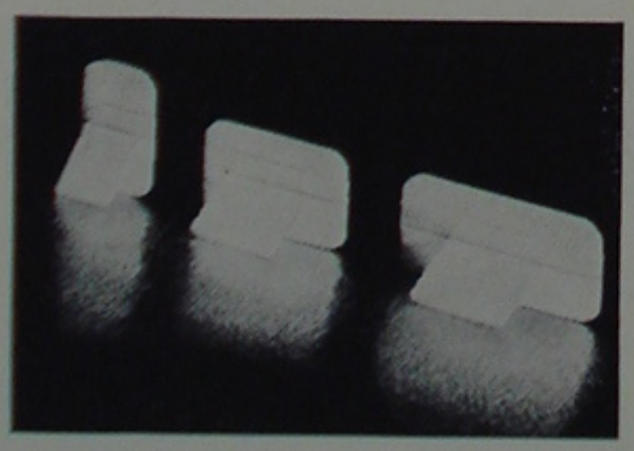
A dental film which possesses the desirable qualities characteristic of a slow, or Regular Brand film with one-half the exposure; a tough emulsion, free from objectionable curl, which withstands the effect of warm wash water; dries quickly; coated on one side of the cellulose base only, which means maximum sharpness of detail and no chance to make a mistake by not knowing which side of the film faced the tube during exposure. Designated by an ALUMINUM coated facing on each packet.

No.		Code
4500	Regular (slow) Brand, 2 films per packet, 24 packets	TEDLM
4501	Regular (slow) Brand, 2 films per packet, 144 packets	TEDMN
4502	Regular (slow) Brand, 1 film per packet, 24 packets	TEDNO
4503	Regular (slow) Brand, 1 film per packet, 144 packets	TEDOP
4504	Double Coated (medium speed) Brand, 2 films per packet, 24 packets	TEDPR
4505	Double Coated (medium speed) Brand, 2 films per packet, 144 packets	TEDRS
4506	Double Coated (medium speed) Brand, 1 film per packet, 24 packets	TEDST
4507	Double Coated (medium speed) Brand, 1 film per packet, 144 packets	TEDTU
4508	Speed (fast) Brand, 2 films per packet, 24 packets	TEDVW
4509	Speed (fast) Brand, 2 films per packet, 144 packets	TEDWX
4510	Speed (fast) Brand, 1 film per packet, 24 packets	TEDXY
4511	Speed (fast) Brand, 1 film per packet, 144 packets	TEDYZ

BUCK Paper Wrapped Dental Packets

(Safety Base, 1¼ x 1⅝ in.)

No.		Code
4512	Single Coated (medium speed) Brand, 2 films per packet, 24 packets	TIABA
4513	Single Coated (medium speed) Brand, 2 films per packet, 144 packets	TIAAB
4514	Single Coated (medium speed) Brand, 1 film per packet, 24 packets	TIACD
4515	Single Coated (medium speed) Brand, 1 film per packet, 144 packets	TIADE
4565	Regular (slow) Brand, 2 films per packet, 24 packets	TIHIS
4566	Regular (slow) Brand, 2 films per packet, 144 packets	TIHJR
4567	Regular (slow) Brand, 1 film per packet, 24 packets	TIHKP
4568	Regular (slow) Brand, 1 film per packet, 144 packets	TIHLO
4569	Double Coated (medium speed) Brand, 2 films per packet, 24 packets	TIHMN
4570	Double Coated (medium speed) Brand, 2 films per packet, 144 packets	TIIZB
4571	Double Coated (medium speed) Brand, 1 film per packet, 24 packets	TIIYC
4572	Double Coated (medium speed) Brand, 1 film per packet, 144 packets	TIIXD
4573	Speed (Fast) Brand, 2 films per packet, 24 packets	TIIWE
4574	Speed (Fast) Brand, 2 films per packet, 144 packets	TIIVG
4575	Speed (Fast) Brand, 1 film per packet, 24 packets	TIITH
4576	Speed (Fast) Brand, 1 film per packet, 144 packets	TIISI



EASTMAN Bite-Wing Dental X-Ray Film Packets

The periodic X-ray examination—Raper Technic—is accomplished by use of the Bite-Wing Film. A wing is provided on which the patient bites; then the crown and coronal third or both the upper and lower dentures are exposed on the film. A complete examination consists of either seven or five films, as three sizes of packets are available.

No.		Code
635	Safety Base, 1-5/16"x1-9/16", 1 dozen package (Type 1), Small	BITER
636	Safety Base, 1¼"x1⅝", 1 dozen package (Type 2), Intermediate	BITMO
637	Safety Base, 1¼"x2⅛", 1 dozen package (Type 3), Large	BITLA

EASTMAN Occlusal Dental X-Ray Film Packets

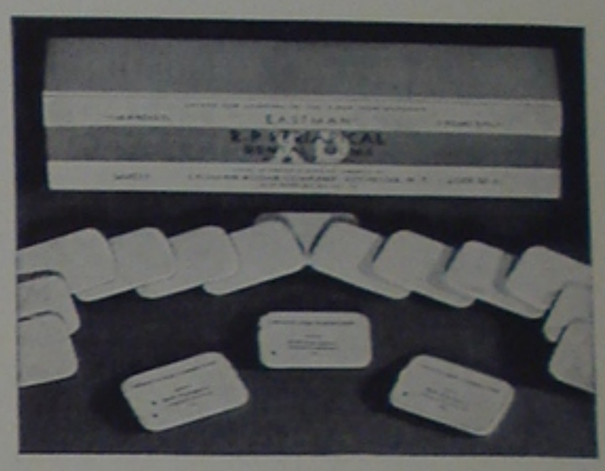
This film is so named because it is retained in position by the full bite of the patient, and because it is ideal to record the relationship of the teeth in the horizontal plane. It is particularly valuable in the location of impactions and the examination of calculi in the salivary duct. Occlusal Films are supplied in the same type white, sanitary packets as Radia-Tized films. They may be obtained with either of two emulsions—Regular (Slow) or Ultra-Speed.

No.		Code
3290	Safety Base, 2¼" x 3" (Slow), 2 film packet, 1 dozen package	OTOAN
3291	Safety Base, 2¼" x 3" (Ultra-Speed), 2 film packet, 1 dozen package	OTOPH

EASTMAN Radia-Tized Dental X-Ray Film Packets

Their many distinctive features have made Eastman Radia-Tized Films an outstanding choice for periapical radiography. Sensitive emulsions are coated on both sides of the base; thus, two superimposed images are obtained in the radiograph. The packets are machine-made, from white, sanitary, waterproof paper, and have rounded corners to give added comfort. An embossed dot readily indicates the tube side. The sensitivity of Radia-Tized Films is midway between "Extra-Fast" and "Regular" Films.

Two sizes are available: Standard (¼" x 1⅝"), for usual adult cases; No. 0 (⅞" x 1⅜"), for adults with narrow arches, and for children. The standard size packets are supplied in boxes of two dozen packets or one gross dispenser packages; the No. 0, in boxes of two dozen packets.



No.		Code
1673	Safety Base, 1¼" x 1⅝", 2 film packet, 1 gross dispenser pkg. (AD Type)	SAFAD
3267	Safety Base, 1¼" x 1⅝, 2 film packet, 2 dozen pkg. (AD Type)	OSCOD
1672	Safety Base, 1¼" x 1⅝", single film packet, 1 gross dispenser pkg. (A Type)	SABAF
3269	Safety Base, 1¼" x 1⅝", single film packet, 2 dozen pkg. (A Type)	OSMAT
3270	Safety Base, ⅞" x 1⅜", 2 film packet, 2 dozen pkg. (O-AD Type)	OSMIC

EASTMAN Regular (Slow) Brand Dental X-Ray Film Packets

Films with slow emulsion when exposed to the proper amount of x-ray usually finish with more contrasty detail than films with more sensitive emulsion.

No.		Code
3271	Eastman Regular (Slow) Brand Dental X-ray Film Packets, 1¼" x 1⅝", 2 film (thin) packet, 1 gross pkg. (CD Type) Safety Base	OSGOO
3273	Same description as above except 2 doz. pkg.	OSSAY
3274	Same description as above except Single film, 1 gross pkg. (CS Type)	OSSIC
3276	Same description as above except Single film, 2 dozen pkg. (CS Type)	OSTHE

EASTMAN Extra-Fast Brand Dental X-Ray Film Packets

Extra-Fast or "Speed" films that have extremely sensitive emulsion and require but very short exposures.

No.		Code
3277	Eastman Extra-Fast Brand Dental X-ray Film Packets, 1¼" x 1⅝" 2 film (thin) packet, 1 gross pkg. (CCD Type) Safety Base	OSTOS
		OTACO
3279	Same description as above except 2 dozen pkg.	OTALA
3280	Same description as above except Single film, 1 gross pkg. (CCS Type)	OTIAT
3282	Same description as above except 2 dozen pkg. (CCS Type)	



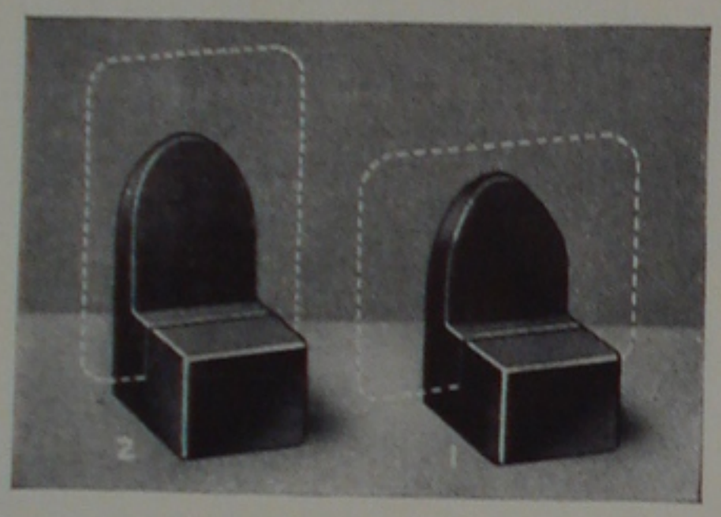
FISCHER Dental Films

Easiest to Open in Darkroom

A new dental film packet now available to the profession. Thin, with round corners, FISCHER dental films combine efficiency with comfort satisfying to the patient. They are the most convenient packets to open in the darkroom—a slight bend elevates the rip tab—pull the tab and the packet is opened. The film is the best that modern emulsion making can produce—giving contrast without sacrifice of detail. Safety base. Packed in one gross, one-half gross and 2-dozen boxes.

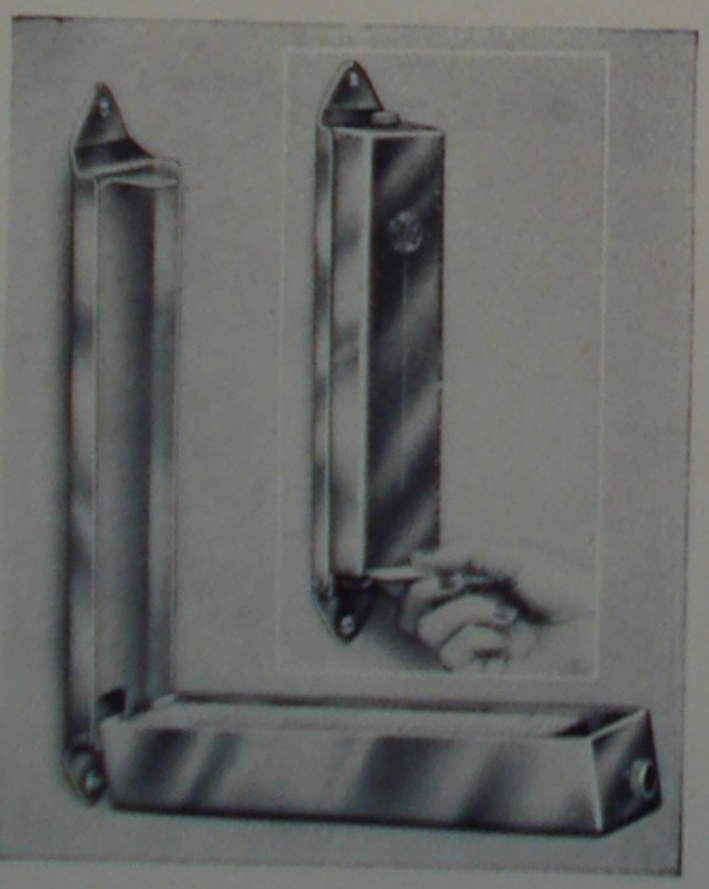
No.		Code
3765	Regular FISCHER, Single Film, 1 gross box	THEOB
3774	Regular FISCHER, Single Film, ½ gross box	TICKO
3766	Regular FISCHER, Single Film, 2 dozen box	THESI
3767	Regular FISCHER, Double Film, 1 gross box	THIAL
3775	Regular FISCHER, Double Film, ½ gross box	TIDAL
3768	Regular FISCHER, Double Film, 2 dozen box	THIGS

BUCK Dental Film Holders



THIS holder consists of a single molded piece of soft, but not too flexible, gum rubber having but slight resistance to x-ray—no seams or crevices to interfere with sterilization. The cushion of the rubber block will be found most comfortable to the patient; also prevents the holder from popping out of position when raying the molar teeth, as is sometimes the case with a non-cushion block. Place the film packet in the holder by bending the block —when the block is released the packet stays in position. Manufactured in style No. 1 for holding the film packet in a horizontal position as in raying the posterior teeth, and style No. 2 for holding the film packet in a vertical position as in raying the anterior teeth. Sold singly.

No.		Code
3206	Buck Dental Film Holder (No. 1 size)	OBEXA
3207	Buck Dental Film Holder (No. 2 size)	TIPIK



BUCK Dental Film Safe

ACCOMMODATES any make of dental film packet—metal or paper wrapped. An efficient, attractive and economical dental film safe. By simply turning a milled screw at the top, the inner section opens to a convenient angle to receive a gross of No. 1 packets, which may be removed from the bottom of the safe one at a time as needed. A weighted follower-block keeps the packets flat and in line for convenient removal. Packets should be placed in the safe with the front or tube side upward. Attaches to wall or panel by the use of a screw at top and bottom. Full chromium finish, inside and outside.

No.		Code
1186	Buck Dental Film Safe	TIMRA

FISCHER Hard Rubber Developing Tank



This outfit consists of a hard rubber tank measuring 10 inches long by 9 inches wide by 15 inches deep, within which are two rubber separators, forming three compartments; for developer, water and hypo fixer. Each compartment has its own drain cock. The center or water compartment has both inlet and outlet. Three feet of heavy laboratory hose is supplied for connection from water supply to lower faucet, the overflow passing into the sink through the metal overflow at the top. Fitted with cover as illustrated. Also fitted with metal bars at top of water compartment to hold dental film hangers while washing. Tank accommodates films in hangers up to and including 8"x10", and holds a full gallon of both developing and fixing chemicals.

No.		Code
1921	FISCHER Developing Tank with 2 No. 1628 film hangers	ZIAWS

BUCKITE One-Piece Compartment Tank



A one-piece, three-compartment tank which accommodates films up to and including 14"x17". The standpipe overflow and drain outlet, also the water inlet fixtures, are of brass. The tank is mounted on an angle iron base of very substantial construction. The solution compartments are raised approximately two inches above the bottom of the washing compartment, into which they empty by the use of a cork or rubber plug. Elevating the solution compartments above the washing compartment permits free draining and easy cleaning when changing developing and fixing solutions. No cover.



No.		Code
1927	Buck Three-Compartment Tank, 5 gallon capacity	ZELNY
2909	Same as No. 1927 except 2½ gallon capacity	TROZO

BUCK Solution Tanks

Molded of Buckite, without seams or joints. Impervious to acid or alkali. Will not disintegrate, scale off, chip or develop pinholes. Ribs cast in block permit free circulation of water beneath the tank. Made in four sizes—2½, 5, 10, and 15 gallons.

No.		Code
2910	BUCK 2½ gallon tank (2¼" x 16¼" x 23¾")	TIEDE
2911	BUCK 5 gallon tank (4½" x 16¼" x 23¾")	TIGER
2912	BUCK 10 gallon tank (9 " x 16¼" x 23¾")	TILIA
2913	BUCK 15 gallon tank (13½" x 16¼" x 23¾")	TILMY

BUCKITE Thermo Tanks

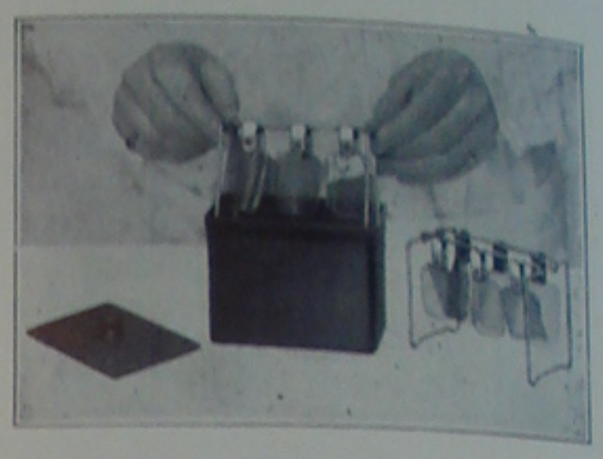


A LINE of temperature insulated developing tank consisting of any desired combination of 30-inch and 22-inch (inside measurement) Buckite Compartment Tanks, all built into one complete unit; has all plumbing connection and controls required for the use of hot, cold and ice water. Standard equipment consists of thermo valve, thermometer, electric time clock, 8" x 10" darkroom lamp, and 8" x 10" illuminator. (14" x 17" illuminator may be had on special order.)

The 22-inch compartment will accommodate a 5-gallon Buckite Developing and a 5-gallon Buckite Fixing Solution Tank, allowing 10½ inches of rinsing space between. The 30-inch compartment will accommodate a 10-gallon Buckite Developing and a 10-gallon Buckite Fixing Solution Tank, allowing rinsing space of 9½ inches between. A special arrangement is necessary where larger solution tanks are desired.

No.		Code
4710	Buckite Thermo Tank—30 and 22-inch compartments	TIODP
4711	Buckite Thermo Tank—30-inch compartment only	TIOOD

Dental Film Developing Tank



This convenient little tank is made of hard rubber and holds 12 ounces of solution. The tank is equipped with a lid also made of hard rubber. A special 6-clip film developing hanger listed as No. 1630 is supplied for use with this tank.

No.		Code
2355	Dental Film Tank Combination, 12-ounce tank and one No. 1630 hanger	ZASAF
2356	Dental Film Developing Tank, 12-ounce size tank with lid	ZASEG
1630	Dental Film Developing Hanger, six clips for use in the above tank	DIXYO



BUCK Model "B" Dental Tank

Designed to be set in a sink or tray. Drain holes in the bottom of each compartment and overflow in back of washing compartment. Made of Buckite. Will not disintegrate, scale off, chip or develop pinholes. Outside dimensions, 12x15x18 inches. Has light-tight cover. End compartments hold one gallon. Center compartment four gallons.

No.		Code
1693	BUCK Model "B" Dental Tank	THOMA

ALL METAL SOLUTION TANKS

Absolutely impervious to DEVELOPING and FIXING chemicals—should last a LIFE-TIME.

No.		Code
4385	2½ gal. size for films up to 14" x 17". Single Tank	TEDFG
4386	5 gal. size for films up to 14" x 17". Single Tank	TEDGH

BUCK Master Tank

Ideal for use where climate necessitates cooling the developing and fixing solutions during the summer months. Permits cold water to surround solutions. Made of Buckite. Not affected by chemical action. Will not disintegrate, scale off, chip or develop pinholes. Overflow at center of back. Outlet at bottom, controlled by valve. Fixtures of brass. Base, angle iron with welded joints, black enameled. Available in two sizes—30 inch inside measurements, end to end, by 26 inches deep and 22 inch inside measurement by 26 inches deep. Width 18 inches, inside measurement.

No.		Code
2898	BUCK Master Tank (30" x 26")	TINCA
2899	BUCK Master Tank (22" x 26")	TINEO



FISCHER 3-Compartment Tank—14" x 36" Films

Hard rubber composition. Supported in angle-iron frame. Drain fittings. For use in developing 14" x 36" films. Best quality. Hard rubber cover.

No.		Code
2914A	FISCHER 3-Compartment Tank for 14" x 36" films	TOTSU

Hard Rubber Trays

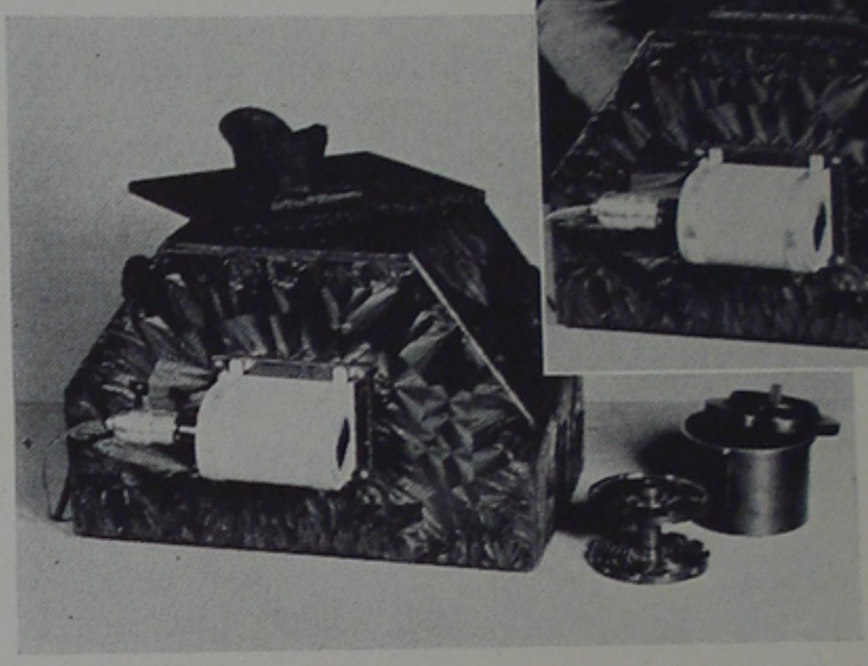
EASILY kept chemically clean. Useful for developing, washing and fixing. The special rubber composition used in these trays is chemically resistant. The surface is chip proof. The rims are reinforced.

No.		Code
4645	For 5" x 7" films, each	TIRRS
4646	For 8" x 10" films, each	TIRSR
4647	For 11" x 14" films, each	TIRTT
4648	For 14" x 17" films, each	TIRXV

FISCHER Daylight Dental Film Developing Box

THIS developing box eliminates the need of darkroom facilities. It is light in weight and portable. The top is removable to permit placing developing tank inside. Two openings for the hands, with light-proof sleeves, enable operator to mount films on the reel which fits inside the developing tank. The light-proof cover of the tank can then be put on, the tank removed from the developing box and the films be developed in daylight—the developer and fixer being poured into the tank through opening in cover. There is a red light bulb on side of developing box. When desired, the developing tank may be purchased separately and used in darkroom or dark closet.





Above: View showing developing box in use. Human figure indicates comparative size.
Left: View shows developing box with top open. At side is shown developer tank and film reel.

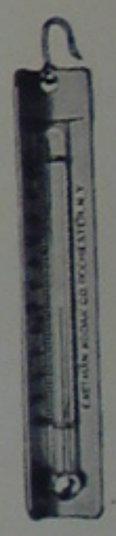
No.		Code
4622	FISCHER Daylight Dental Film Developing Box with tank and reel	TILHW
4623	Developing tank complete with film reel	TIPFG
4624	Film reel only for No. 4623 Tank	TIPGH



Thermometer

Serves a double purpose; handy as a stirring device, and automatically indicates the temperature of the solutions. Equally valuable in tank or tray development.

No.		Code
202	Thermometer	HERDE

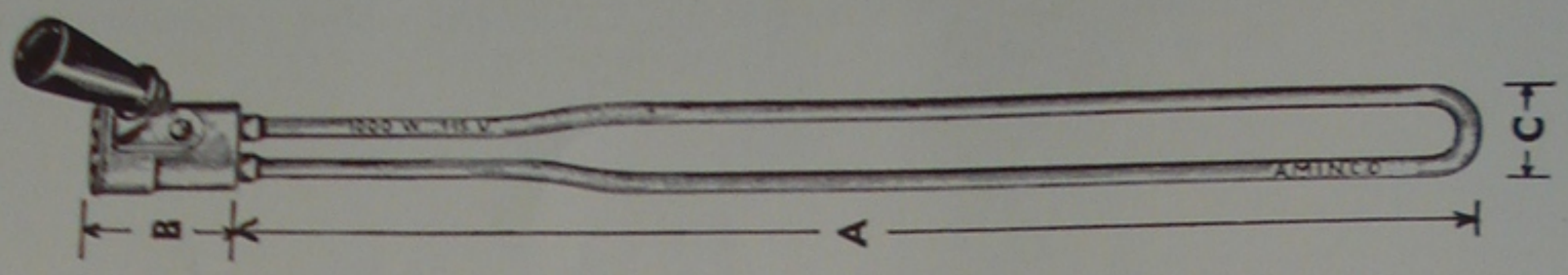


Floating Thermometer

Hydrometer type of floating thermometer, graduated up to 100° Fahrenheit. Has bright red line at 65° (proper temperature for developing solution.)

No.		Code
3296	Floating Thermometer	OBTUN

"Hairpin" Portable Immersion Heater (4526M)

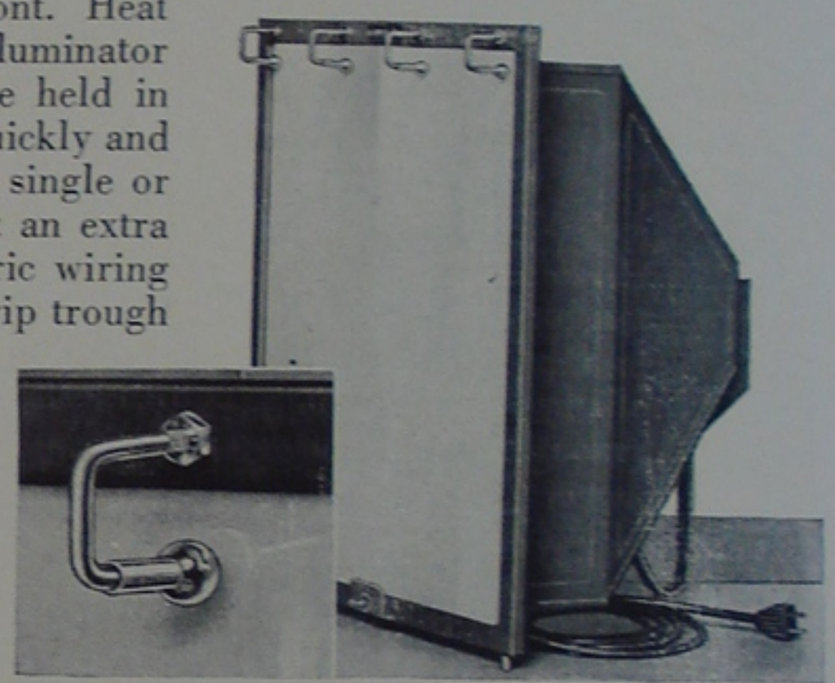


RECOMMENDED for bringing liquids up to a required temperature quickly or for compensating for radiation losses in liquids that are to be kept at higher than room temperatures. The heater is a single loop, attached to a sturdy metal terminal with convenient hook and handle so that the heater can be hung over edge of liquid container. Supplied complete with rubber-covered cord and attachment plug.

No.		Code
4678	"Hairpin" Portable Immersion Heater	TIMMD

BUCK Cold-Front Illuminator

ALL-METAL illuminator with clear glass baffle, 4 inches behind front. Heat from electrical bulb meets this baffle and is conducted out of the illuminator through slot in top. Permits safe examination of wet films. Films are held in position by spring clips. Front frame made of formed steel. Possible to quickly and easily assemble together any desired number of illuminators, forming a single or double decked group. Any desired group will be built at the factory at an extra charge of $1.50 for each illuminator contained in the group. The electric wiring is entirely enclosed in metal. Shockproof switch on each illuminator. Drip trough for catching drippings from wet films supplied at $1.50 extra. The Buck Illuminator accommodates a 250 watt special x-ray illuminator bulb, or any smaller bulb. (Bulb not included with the illuminator.) The front is a combination of Opal Blue Glass with a clear glass baffle (one sheet of each) supplied as standard. "North Light" Glass supplied for $6.50 extra.





No.		Code
3259	BUCK Cold-Front Illuminator, 14" x 17"	GIGAN
3258	BUCK Cold-Front Illuminator (group of 4, 14" x 17")	GNATH

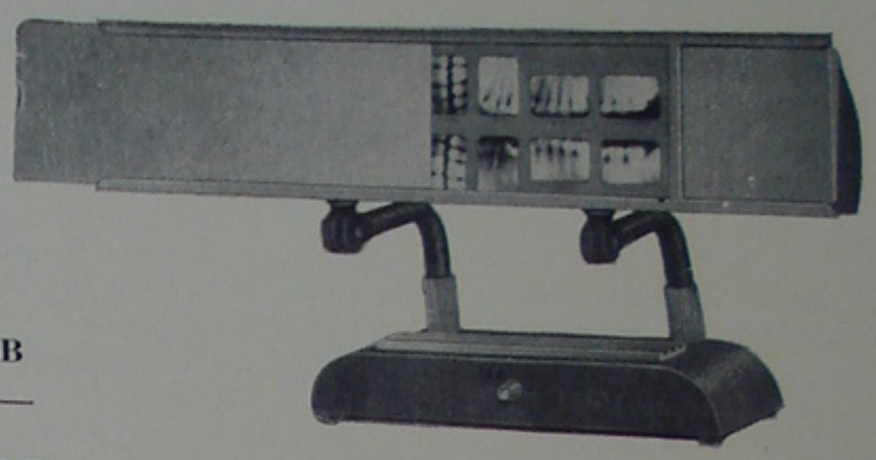


BUCK Fluorotube Illuminator

CONSTRUCTED with three large-diameter daylight fluorescent tubes having low current consumption. The three tubes eliminate vertical shadows and give maximum luminosity. Illumination is soft blue-white, yet penetrates denser portions of radiograph. Frame of metal with double strength white-opal glass front. Available as single unit or in group of four units. Can be grouped with Buck Cold-Front units. Finish, gray-green with nickeled switch and clips. Alternating current only, 110 volt. Drip troughs supplied at $1.50 extra per unit.

No.		Code
3738	Buck Fluorotube Illuminator 14" x 17"	TIMLE

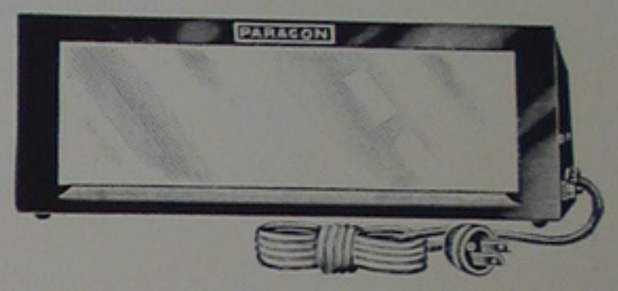
PROFESSIONAL Fluorescent Dentaray



THIS is a double-duty lamp that may be placed on the dental cabinet, first, for illuminating dental films, as shown in the illustration; second, it will throw sufficient daylight over the entire working surface of the cabinet for mixing cements or selecting shades of porcelain. The lamp consists of a 15-watt, 18" daylight tube. Height of unit, 10", length, 18". Base, 10"x4½". Operates on A.C. or D.C. Tube guaranteed for one year.

No.		Code
3740	Professional Fluorescent Dentaray	TIMSB

PARAGON Dental Illuminator



The Paragon Dental Illuminator embodies all the essential qualities required for the proper illumination of dental radiographs. It is compact in size, yet large enough to accommodate a fourteen window mount; it is equipped with one 12" tubular lamp, new style, day-light, blue flashed opal glass and six foot cord. The switch is placed in the forward lower corner of the right end wall, the most convenient place to reach with the right hand. Ample ventilation allows the heat generated by the lamp to escape readily. The inside is finished in daylite white, giving an even distribution of diffused light over the entire surface of the glass front. Outside finished in silver green.

No.		Code
3734	Paragon Dental Illuminator, complete with 12" tubular lamp, 6' cord, switch and flashed opal glass.	TACOS

SPECIAL GLASS FOR ILLUMINATORS

No.		Code
3753	Opal Glass for Paragon Dental Illuminator No. 3734	THALA
3754	Opal Blue Glass for No. 3734	THANY
3755	Opal Blue Glass for FISCHER No. 551—8" x 10" Illuminator	THEAS
3756	Opal Blue Glass for No. 3259 and No. 3260 Buck 14" x 17" Illuminators	THECA
3758	Opal Glass for 14" x 36" Illuminator No. 3736	THEEL

DAYLIGHT (INSIDE FROSTED) BULBS FOR ILLUMINATORS

No		Code
3761	40 watt Special Long Bulb for Illuminator No. 3734, 110 volts	TEXTU
3762	250 watt Illuminator Bulb, 110 volts	THAMO
3763	200 watt Illuminator Bulb, 110 volts	TIQUE
3764	150 watt Illuminator Bulb, 110 volts	DACER

Prices on bulbs for other than 110 volts quoted on request.

AGFA Rapid X-Ray Developer



Agfa Rapid X-Ray Developer is a scientifically prepared formula mixed from photographically pure chemicals. It is packed in metal containers and needs only to be dissolved in water to be ready for use. It produces more contrast than was previously possible with developer formulae used in the past.

No.		Code
4156	1 gal. Agfa Rapid X-Ray Developer	TALOO
4157	3 gal. Agfa Rapid X-Ray Developer	TALPP
4158	5 gal. Agfa Rapid X-Ray Developer	TALMO

AGFA X-Ray Fixer

Agfa X-Ray Fixer is a dependable preparation which insures the proper quantity and quality of all chemicals required for complete fixation. Agfa X-Ray Fixer contains the correct amount of Potassium Alum to prevent softening of the emulsion if wash water becomes too warm. Agfa X-Ray Fixer is also packed in metal containers ready for use when dissolved in water. It is particularly good for hot weather work.

No.		Code
4161	1 gal. Agfa X-Ray Fixer	TALOP
4162	3 gal. Agfa X-Ray Fixer	TALRR
4163	5 gal. Agfa X-Ray Fixer	TALSS

EASTMAN X-Ray Developer



Eastman X-Ray Developer is especially prepared for x-ray development and offers the most economical and convenient means of obtaining the best results in either tank or tray development of films. They cost no more than developers prepared from formulas and their use precludes the possibility of waste through faulty preparation of solutions.

No.		Code
3356	Can containing sufficient powder to prepare one gallon of ready-to-use solution	GALBY
3357	Can containing sufficient powder to prepare five gallons of ready-to-use solution	GALLA

EASTMAN X-Ray Fixer

These powders are the final step in the standardization of the processing of x-ray films. They are ready for use with the addition of water, and the solution thus obtained is clear and colorless. They combine fixing with maximum hardening, and are packed in convenient sizes to make tank recharging easy.

No.		Code
3362	Can, for preparing one gallon of solution	GALTO
3363	Can, for preparing five gallons of solution	GAMET

EASTMAN Concentrated (Liquid) X-Ray Developer

EASTMAN Tested Chemicals in liquid form, for developing and fixing x-ray films. To make ready-to-use solutions it is only necessary to dilute with water; entire amount may be prepared at once or small quantities used as desired. Quart bottle makes 1 gallon of solution.

No.		Code
4675	Eastman Concentrated X-Ray Developer (quart bottle)	TIMIG

EASTMAN Concentrated (Liquid) X-Ray Fixer

SUFFICIENT to make 1 gallon of fixer; contents of "A" bottle is diluted with water and solution in "B" bottle (hardener) added. Has exceptionally rapid clearing action.

No.		Code
4676	Eastman Concentrated X-Ray Fixer (quart bottle and hardener)	TIMKF

BUCK Developing Chemicals



THE value of Buck X-Ray Developer and Buck X-Ray Fixer lies in the lasting quality of the solutions and the diagnostic value of the finished radiograph. In this day of high speed film and equipment, it is absolutely necessary that maximum uniformity be maintained, if satisfactory and economical results are to be expected. To "make good" not only means producing something which is good enough to "get by," but something which is the best possible to produce. The best is the cheapest in the end. Buck X-Ray Developer and Buck X-Ray Fixer are high grade photographic chemicals—there is nothing better.



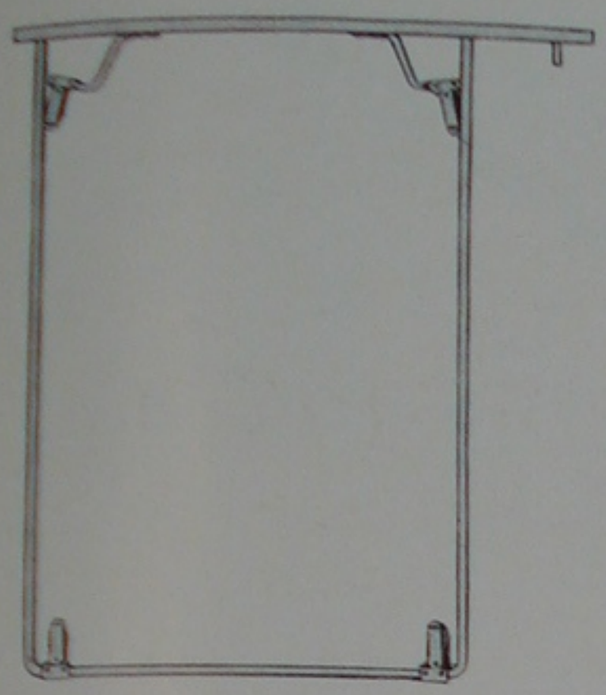
BUCK X-Ray Developer

No.		Code
680	Six powders to the package, each powder makes 16 oz. of solution	LAIRD
681	Makes 1 gallon solution	LAMBO
685	Makes 5 gallons solution	LEVAN

BUCK X-Ray Fixer

No.		Code
683	Makes 64 oz. of solution	BRAXY
707	Makes 1 gallon solution	ZIKGA
708	Makes 5 gallons solution	ZIKHE

FISCHER Developing Hangers



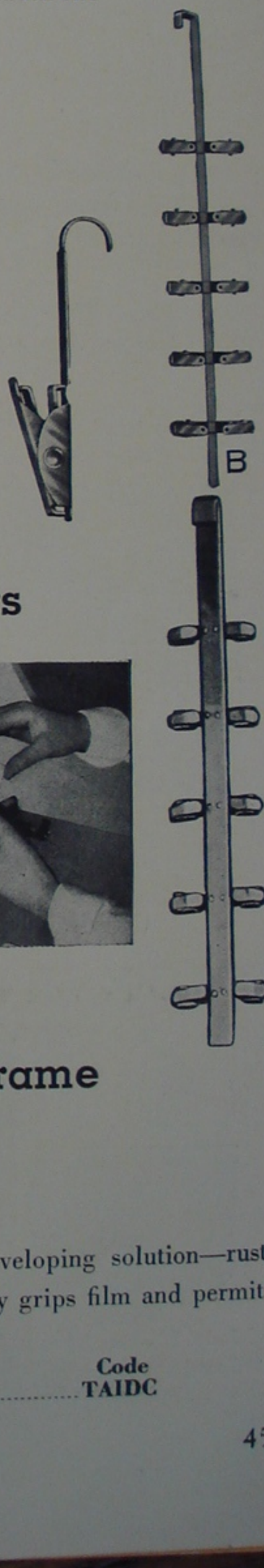
THE processing of x-ray films is made much easier by the use of proper developing hangers. Not only the development but fixing, washing and drying are also facilitated by their use.

FISCHER hangers are made of metal which is unaffected by the action of developing solution. A spring clip at each corner securely grips the film so that it is handled conveniently. The hangers are made with a 16-inch, square cross-bar for use to the best advantage in the tank method.

No.			Code
1715	Size 5 " x 7 "	FISCHER Developing Hanger	INCUR
1716	Size 6½" x 8½"	FISCHER Developing Hanger	INDEE
1717	Size 8 " x 10 "	FISCHER Developing Hanger	INDEN
1718	Size 10 " x 12 "	FISCHER Developing Hanger	INDEX
1719	Size 11 " x 14 "	FISCHER Developing Hanger	INDIA
1714	Size 14 " x 17 "	FISCHER Developing Hanger	INDIC
3732	Size 14 " x 36 "	FISCHER Developing Hanger	TANAX

BUCK Dental Film Developing Clips

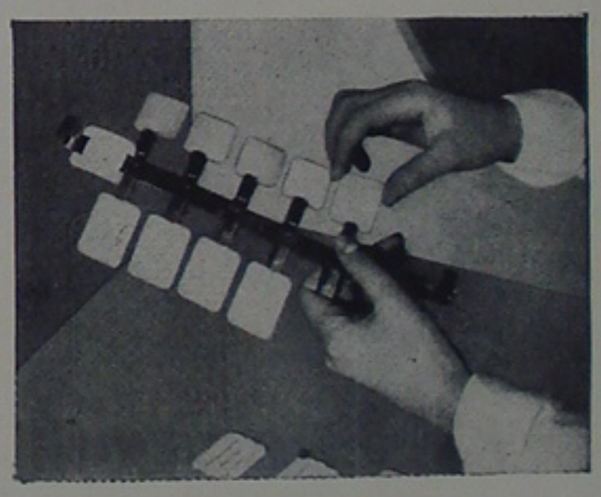
Each clip is made with a single tooth upper jaw which firmly clamps the film against a perforated low jaw, thereby securely holding the film without making an ugly perforation or crimping the edge. The flat spring is much heavier and stronger than would be possible with any other style of spring in such a limited space. Silver deposits on the surface of the spring will not interfere with its flexibility. All clips are rigidly mounted on a heavy bar. The variety of styles manufactured will meet the requirements of every office, laboratory and hospital. All clips are securely riveted to the bar or frame. This overcomes the possibility of the clips coming loose. The substantial construction means long life and economy.



No.					Code
3395	Single Clip	(Buck Style A)	Dozen		OCCAY
3396	Ten Clips	(Buck Style B)			OCCIP
3403	Short style for dental tanks	(Buck Style SD)			OCTIP

EASTMAN Dental Film Developing Hangers

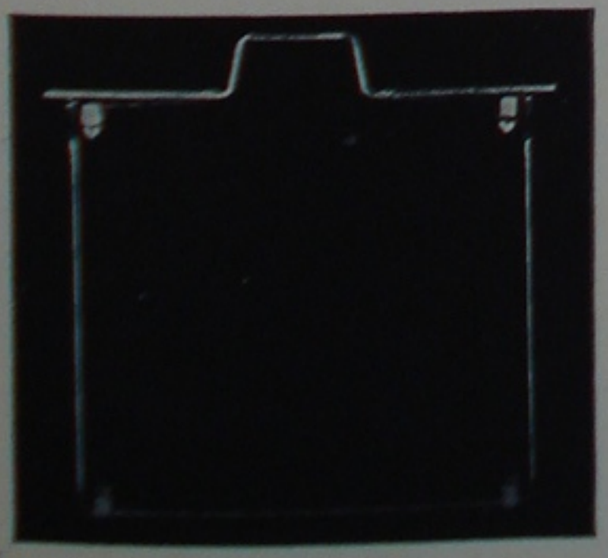
As illustrated, these are made in various types and groups. Arranged to hang over the side of the developing tank or on a rack for drying purposes. Eastman hangers have a white marker at the upper end of the rod on which the case number may be written.



No.		Code
1627	(Eastman No. 2) Dental Film Hanger—10 clips	DAXED
1628	(Eastman No. 3) Short Model with 10 clips	DEDAY
1629	(Eastman No. 4) Long Model with 14 clips	DADYI
1630	(Eastman No. 5) With 6 clips for use in special shallow developing tanks	DIXYO
1634	(Eastman No. 7) Dental Film Hanger, 16 clips	DAGTW

FISCHER Developing Frame

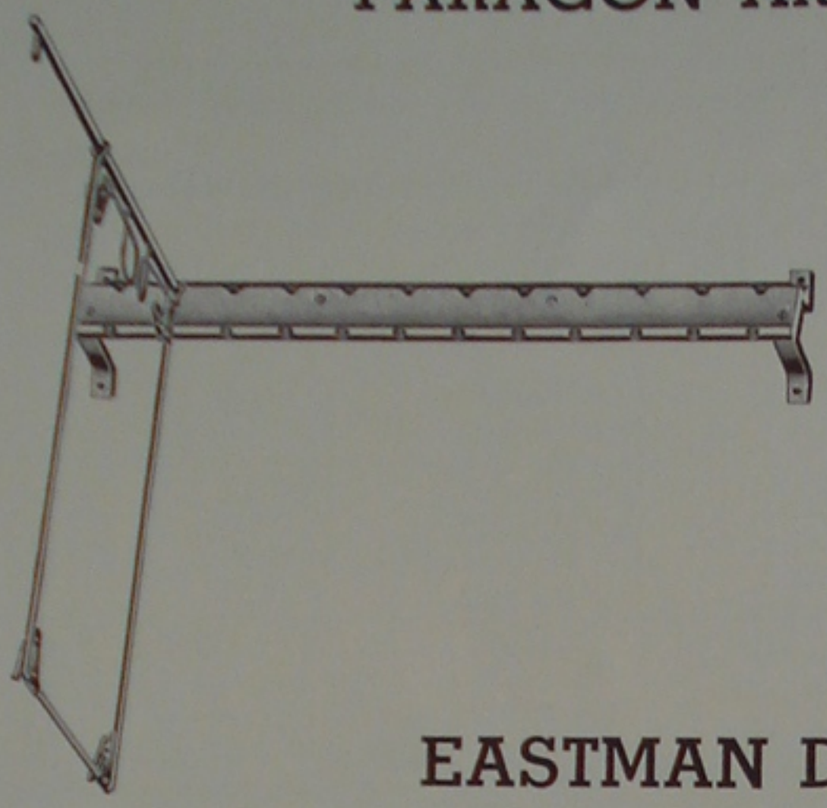
For Holding 14" x 17" Films in 36" Developing Tank.



Made of metal which is unaffected by the action of developing solution—rust-proofed steel. A spring clip arranged at each corner securely grips film and permits convenient handling.

No.		Code
4042	Developing Frame for holding 14x17" Films in 36" Developing Tank	TAIDC

PARAGON Aluminum Film Drying Rack



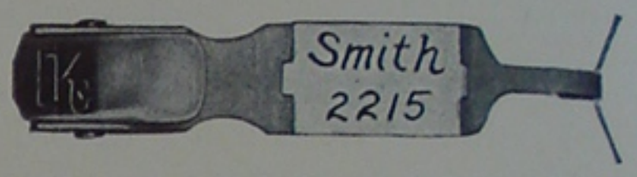
An all aluminum film drying rack to hold twelve films. Extremely simple in its design and operation. Complete with screws for wall mounting.

No.		Code
3261	Paragon Aluminum Drying Rack	THORY

3261A • PRESSED STEEL

EASTMAN DENTAL Film Developing Clip

This individual clip for holding a single film can be suspended on the side of the tank. Each clip has a white marker on which a case identification may be written.



No.		Code
1639	Single Film Clip with hook to hang over edge of tank or tray, per dozen	DAFTA

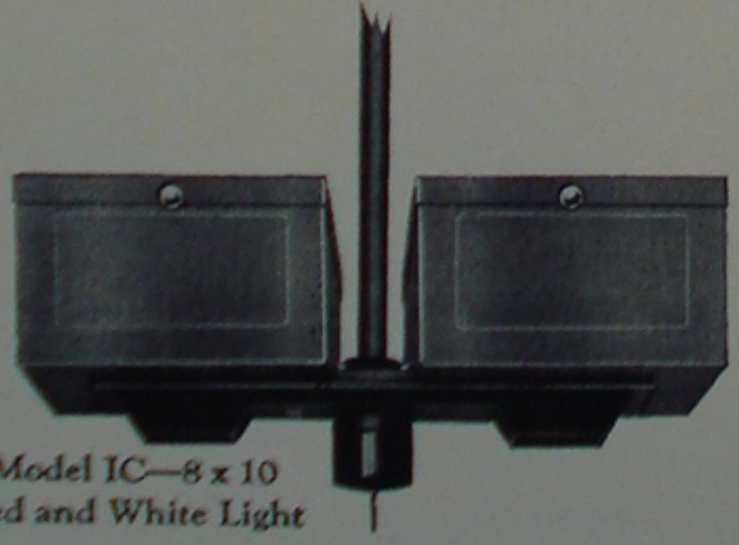


EASTMAN Darkroom Lamp

AN efficient, suspension-style safelight lamp. Attaches to drop-cord or appropriate fixture by means of threaded connector. Shell of steel with attractive gray enamel finish. Diameter, 5½ inches. The interior surface reflects an exceptionally extensive spread of light for the size of the lamp. A 10-watt incandescent bulb is required.

No.		Code
1599	Eastman Darkroom Lamp	TIMHI

BUCK Red and White Light—MODEL "IC"



Model IC—8 x 10
Red and White Light

THIS model is an indirect ceiling lamp, consisting of two 8x10 lamps (one red and one white) mounted on a horizontal base and attachable to the ceiling by use of a standard. A three-way switch with drop cord controls the lights. Construction is very substantial. 40-watt bulbs may be used. Underwriter listed.

No.		Code
3352	Buck Red and White Light—Model "IC"	TIMGK

BUCK Darkroom Lamps



Made of a substantial weight of steel metal, all joints welded. Inside of each lamp is a curved reflector to give even distribution of light. The electric wiring is concealed according to the best code requirements. The switches used are of the two-pole type which prevents shock if touched with wet hands. The front frame is easily removed to change safelight or bulb. The grey green finish is highly resistant to rust caused by the action of water, developer or fixer.

Nos. 3348 and 3349 can be placed on a shelf or hung on the wall. Supplied with 15-watt frosted electric bulb and extension cord. Red safelights are standard, other colors special.

No.		Code
3348	Model "B" Darkroom Lamp—5" x 7" Safelight only	OCTOM
3349	Model "A" Darkroom Lamp—8" x 10" Safelight only	OCULA
3350	Model "BX" Darkroom Lamp—5" x 7" Safelight only	TIBMO
3351	Model "AX" Darkroom Lamp—8" x 10" Safelight only	TIBOP

KODAK Safelight Lamps



The Kodak Safelight Lamp is ideal for all darkroom uses. Fitted with Wratten safelight, which provides even distribution of colored light and perfect safety from white light. Price includes Safelight, four feet of connecting cord and plug. No electric bulb is furnished, but a 25-watt Mazda bulb is recommended.

No.		Code
1602	Kodak Safelight Lamp	BATHK

"BROWNIE" Safelight Darkroom Lamp



Slightly larger than the electric bulb it holds, the Safelight Lamp screws into an electric socket which may be conveniently situated close to the place where the work is done. To be used with 10-watt bulb.

No.		Code
1601D	"Brownie" Safelight Darkroom Lamp	BATHO
4166	Agfa Safelight Filter, 5"x7"	TASOO
4167	Agfa Safelight Filter 8"x10"	TASOR

Albader—Gall Bladder Dye



MANUFACTURED from Mallinckrodt Iodophthalein Soluble, U.S.P., 11—a product by the original producer of gall bladder dye. Albader is freely absorbed and, with rare exceptions, non-irritant. The uniformity of Albader permits precise compilation of statistics in gall bladder studies. The roentgenologist's reliance on Albader is nation wide, in laboratories, and hospitals, both large and small, proving it a dependable aid in cholecystographic examinations.

No.		Code
3751	Albader—Gall Bladder Dye (4 grams of dye)	TIMOC
3751A	Box of 12—3751 Bottles	TIPMO

FISCHER Fluoroscopic Foot Switches



As illustrated, this Foot Switch lies close on the floor. A touch of the toe makes and breaks the contact. It is molded of bakelite with sufficient insulation to make it shockproof. It is easily moved about, yet keeps an upright position on the floor. The cable is flexible and covered with pure gum rubber; it may be washed and kept as new always. Cable terminals will be furnished to fit any style apparatus; specify machine used, when ordering.

No.		Code
1206	Extra rubber covered cable, per foot	TIBER
1495	Fischer Foot Switch with two prong plug for use with Model "H" Portable X-ray	TARWW
1497	Fischer Foot Switch with two prong plug on connecting cord as used with FISCHER "100-100" and "SP-100" X-ray Units, and also all FISCHER Short Wave Apparatus	ZISYV
1497-A	Fischer Foot Switch with three prong plug on connecting cord as used with FISCHER "60-88", "DS-60", and "SP-60" X-ray Units	SABXW
1497-B	Fischer Foot Switch with three prong lock type plug on connecting cord for use with Fischer Model "G" Shockproof X-ray Apparatus	TATSO
1497C	Fischer Foot Switch for use with No. 4480A Control	TICBD
1498	Fischer Foot Switch with two tips on end of connecting cord as used with older FISCHER Long Wave Diathermy Apparatus	WAVIN

FISCHER Remote Control X-Ray Switch

A simple hand switch, of the "push button" type, mounted in a very neat octagon shaped moulded Bakelite handle with 6-ft. cable for use wherever remote hand control is desired in connection with x-ray apparatus.

No.		Code
3996	FISCHER Hand Switch	SACBB



Spring-Actuated Hand Timer

Of exceptional accuracy. Thoroughly insulated for safety. Calibrated to permit exposures from one-fourth second to 12 seconds. This timer serves both as an x-ray switch and a timer. Automatically breaks current at expiration of time set. Housing of bakelite. Cord length, approximately 54".

No.		Code
408	Fischer Spring Actuated Hand Timer for use with Catalog No. 2240 "DENTAL-X"	FANLI
408B	Fischer Spring Actuated Hand Timer for use with Model "G" Fluoroscope and "G" Remote Control	TARHG
408C	Fischer Spring Actuated Hand Timer for use with Model "H" Portable X-Ray Unit	TEALM
408D	Fischer Spring Actuated Hand Timer for use with 4480 Control	TIBSR
408E	Fischer Spring Actuated Hand Timer for use with "WMDX" Dental X-Ray Unit	TIDGE

The HAWKEYE Timer

Registers the length of any treatment exactly. A wonderful aid to accurate timing, particularly valuable when the physician is treating more than one patient at a time. The Hawkeye rings an alarm at the exact moment treatment should end. Frame is of Bakelite. Furnished with black or ivory finish. Calibrated in minutes.



No.		Code
3917	Hawkeye Timer	DABAB

Leaded Rubber Glovets



MADE from a specially manufactured soft, flexible lead rubber, having protective qualities which conform to the required standards, with an outer covering of high grade horsehide, noted for its wearing quality, and a lining of strong knitted fabric. This efficient and low-priced Glovet will unquestionably find instant favor with those who try it. Over-all length, 13 inches.

No.		Code
4054	Lead Rubber Glovets, Pair	TIGYB
4054-1	Left Hand Glovet only	TIPHI

Leather-Covered Leaded Rubber X-Ray Protection Gloves



These gloves are made of soft buckskin, lined with 3/64″ leaded rubber, protected with an additional cloth insert. The rubber lining is equal in protection value to .5 mm. lead. Soft and pliable. These gloves permit free movement of the hand and fingers. Also, they offer ample protection in fluoroscopic work.

No.		Code
4053	Improved with added protection and flexibility (medium size)	TAMAJ



Waterproof Aprons

Laboratory and clinic apron of featherweight fabric, waterproof, odorless, flexible. Can be washed. Will not crack or peel. Gives maximum comfort and service.

No.		Code
3370	Waterproof Apron	TATBA

Leaded Protection Apron



Length over all 36″. Weight 8½ lbs. Thickness 1/16″. Protective value equivalent to approximately .5 mm. sheet lead.

No.		Code
385A	Leaded Rubber Apron	AMOTT

Insulating Oil for Transformers

When, for any reason, the insulating oil in which a transformer is immersed needs replenishing, *never use ordinary lubricating material.* The proper oil must be mineral in substance, and capable of withstanding a very high flash test. The safest procedure is to order the desired quantity from us, with the assurance that only that oil which is exactly correct will be sent you.

No.		Code
725	Tested Transformer Oil, in 1 qt. can	TRAFI
726	Tested Transformer Oil, in 1 gal. can	TANOI

Leaded Rubber Protection Sheeting



X-Ray Protection Cloth, in strips 36 inches wide, any length, made of heavy lead impregnated rubber with a linen center, insuring great strength as well as absolute protection. 1 square yard averages about 14 lbs. Order by size instead of by weight. Sold any length, by 36 inch width.

No.		Code
383	Leaded Rubber Protection Sheeting, lb.	AMEBA





GASTROPAQUE
(Buck Barium Meal)

Gastropaque (Flavored) is prepared with a low food value. The viscosity is sufficient to carry the barium in suspension for a reasonable length of time, and the flavor indicates a beverage rather than a food. Manufactured from a highly pure grade of barium sulphate guaranteed free from coarse crystals, which will irritate inflamed tissue, also free from toxic-causing impurities. Mixes without difficulty. The flavor makes this barium meal an inviting drink, and it will not sour even if prepared a day or more in advance of use. Supplied in 10 lb. hermetically sealed cans, also in cartons containing twenty individual packets for individual meals. Each package is carefully weighed and ready for use by adding the correct amount of water. This is not only a convenience, but insures uniform preparation at all times.

Gastropaque (Unflavored) is intended for use in colon examination —may be used as a barium meal with or without the addition of a flavoring medium.

No.		Code
3222	Gastropaque (Flavored) 20 dose pkg.	TIGXC
3223	Gastropaque (Flavored) 10 lb. hermetically sealed tin	TIGWD
3224	Gastropaque (Unflavored) 10 lb. hermetically sealed tin	TIGVE

PARAGON Barium Sulphate
For Abdominal Work—(99.92% Pure)

Paragon Barium Sulphate is an extremely fine, non-toxic pure barium sulphate; has been used by leading Roentgenologists for years. It is very finely ground and goes into suspension readily in buttermilk, or any of the ordinary mixtures. Gives clear, dense shadows, disclosing clearly any pathological condition which may exist. Packed in sealed containers.

No.		Code
3741	1-lb. container	TERSY
3742	5-lb. container	TERER
3743	10-lb. container	TERMI
3744	25-lb. container	TERNO
3745	50-lb. container	TEROX

FISCHER Electro-Synchrotimer



View of Synchrotimer showing easy method of fastening to x-ray apparatus and the remote hand control switch.

Accurate timing of exposures is essential in making x-ray negatives. Timing is one of the four main factors to consider—it is just as important as tube-film distance, milliamperage, and kilovoltage. Without accurate timing, good negatives cannot be produced and the positive repetition of results is impossible. The two chief features of this new FISCHER Electro-Synchrotimer are (1) its accuracy and (2) the fact that it measures time in fractional seconds.

No.		Code
3670A	1/10 to 15 seconds, 110 volts, 60 cycles, less bracket	HEINE
3676A	1/4 to 30 seconds, 110 volts, 60 cycles, less bracket	HEYNS
3679A	1/2 to 60 seconds, 110 volts, 60 cycles, less bracket	HIDRO
3685A	1/10 to 15 seconds, 110 volts, 50 cycles, less bracket	HIDOP
3694A	1/2 to 60 seconds, 110 volts, 50 cycles, less bracket	SACMM
3674A	1/10 to 15 seconds, 110 volts, 60 cycles, with bracket	HEXIT
3678A	1/4 to 30 seconds, 110 volts, 60 cycles, with bracket	HICKY
3681A	1/2 to 60 seconds, 110 volts, 60 cycles, with bracket	HILUS
3687A	1/10 to 15 seconds, 110 volts, 50 cycles, with bracket	HIRSU
3688A	1/2 to 60 seconds, 110 volts, 50 cycles, with bracket	JATRO

All timers above are arranged to fit the control boxes on FISCHER X-Ray Apparatus.

The following FISCHER Electro-Synchrotimers are for use with outfits not of FISCHER manufacture. The order must clearly state outfit with which timer is to be used.

No.		Code
3689	1/10 to 15 seconds, 110 volts, 60 cycles	SACHH
3690	1/4 to 30 seconds, 110 volts, 60 cycles	SACII
3691	1/2 to 60 seconds, 110 volts, 60 cycles	SACJJ
3692	1/10 to 15 seconds, 110 volts, 50 cycles	SACKK
3693	1/2 to 60 seconds, 110 volts, 50 cycles	SACLL



FISCHER Electronic Timer

Of the automatic-reset type. Automatically resets itself to make succeeding exposures of the same, or identical, time interval. Switch permits release of Bucky diaphragm by timer push button. Accurately times exposures from 1/20 second to 20 seconds.

No.		Code
4120	FISCHER Electronic Timer	TAMSS

Synchronous Motor-Operated MINUTE MINDER



Provides accurate time and, when required, serves as a reminder at end of preset interval. Records up to 1 hour and 55 minutes. Operated by sturdy self-starting synchronous motor. For 110 volt, 60 cycle, A.C. In the photographic darkroom, an audible signal is repeated every second as long as required. A second hand provides added convenience.

No.		Code
4027	Synchronous MINUTE MINDER, as illustrated	TIBJK

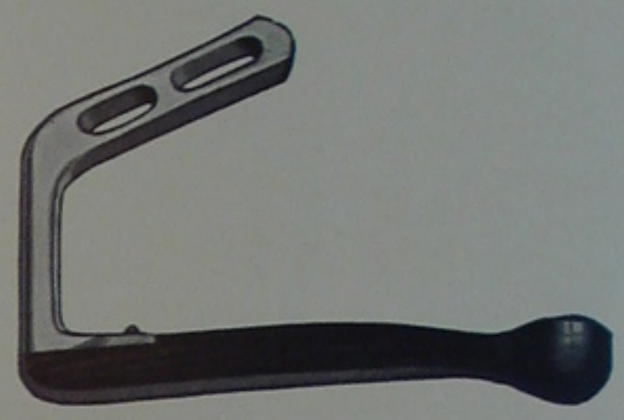
PARAGON Bari-Susp

A pleasant and palatable mixture of the famous Paragon brand Barium Sulphate and a Carbo-Hydrate, with flavoring, making an ideal visualizing preparation for abdominal radiographic work. Just add water and serve. No buttermilk or other vehicle necessary, but may be added if desired without causing precipitation. For the six hour test or fluoroscopic examination in adults, the average amount of Bari-Susp used is about 4 very heaping teaspoonfuls suspended, preferably in two glasses of water. A larger quantity of Bari-Susp and water is used for enemas.

No.		Code
3746	5 lb. container. Paragon Bari-Susp	TESSE
3747	10 lb. container. Paragon Bari-Susp	TETAN
3748	25 lb. container. Paragon Bari-Susp	TETAR

Palparium Spoon for Fluoroscopic Work

This spoon is intended for use where the operator does not choose to use the hand. The face of the spoon is covered with a circular shaped piece of lead which reflects the position of the spoon on the screen.



No.		Code
3749	Paragon Palparium Spoon	TETBO

X-Ray Opaque Chemicals — Keraphen

A soluble, pleasant form of tetraiodophenolphthalein for oral administration in cholecystography. Keraphen is a peppermint flavored, bluish gray powder which gradually turns into a creamy white liquid when mixed with a quarter glass of water. It does not disturb the digestion or create the nausea that ordinarily results from plain Tetraiodophenolphthalein. When placed in an alkaline medium Keraphen readily yields sodium Tetraiodophenolphthalein in its purest form for absorption by the body. Keraphen is supplied in single dose bottles of approximately 12 grams each.



No.		Code
3780	12 doses Regular Keraphen A	THYMI
3781	12 doses Heavy Keraphen B	THYRA
3779	12 doses Twin Keraphen X	TIBIH

Neo-Iopax

Neo-Iopax for intravenous pyelography. The simplest diagnostic aid for visualization for the kidneys and ureters. Gives the sharpest radiographs with the smallest dose.

20 cc. is the adult dose. Simply warm ampule, inject, make the exposure a few minutes later, and the result should be a clear cut radiograph.

No.		Code
3782	20 cc. ampule Neo-Iopax	SABWU

Tetradol Emulsion

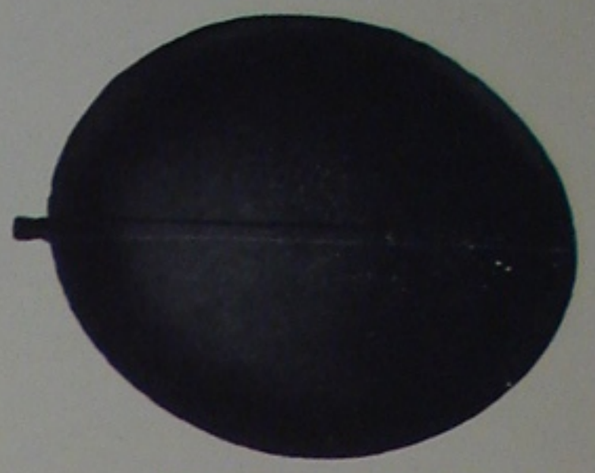
(For Oral Administration in Cholecystography)

This dye is administered as a very fine, freshly precipitated colloidal suspension, which upon passing into the duodenum is readily converted into the soluble salt and easily absorbed. The method of administration is very simple and can be readily performed by the patient without fear of mistakes. Contents of one bottle of Tetradol Emulsion stirred into a glass of grape juice or water make the complete dose. Nausea or unpleasant by-effects are rare and shadows of excellent density are uniformly obtained.



No.		Code
3784	Tetradol Emulsion, Single dose Tetradol Emulsion	TIBIL
3785	Tetradol Emulsion, One Dozen doses Tetradol Emulsion	TIBLA

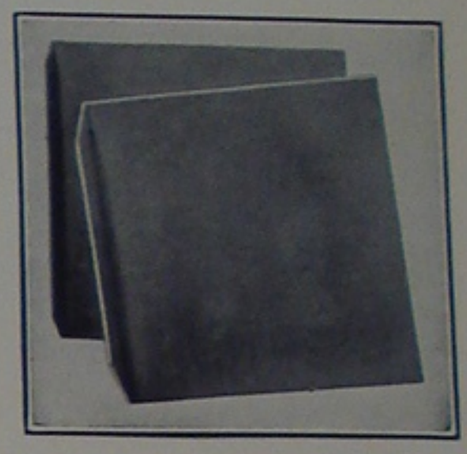
Compression Bladder



Made of ribless rubber, with a single seam which will not at any time offer obstruction in the active field. Compressor inflated will conform to any contour perfectly—deflated is 12″ in diameter.

No.		Code
585	Compression Bladder	RUBCO

Aluminum Filters



Made of pure sheet aluminum, 1 mm. thick.

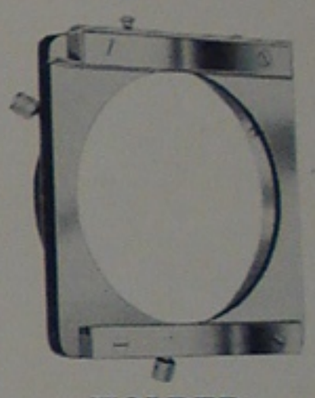
No.		Code
1067	Round Aluminum Filter, 2-7/16″ diameter. (Fits Fischer "DENTAL-X")	ZIZUB
3558A	Square Aluminum Filter, 4″ x 4″—has narrow edge. (Fits Fischer "60-88," "SP-60" and "DS-60" Machines)	FLUKE
3559A	Same as No. 3558A, but with wide folded edge (see cut)	FLUSH
3560	Aluminum filter for "DSP-20" tubehead	SADOO

ADJUSTABLE Filter for 36″ Spine Radiography



FILTERS

CONSISTS of aluminum frame into which adjustable copper filters may be inserted. These copper filters are of different sizes and shapes and through selection or combination permit any desired amount of filtering. Note illustration of filters (left) and of holder (right). For FISCHER Models "60-88" and "100-100", the filters only are needed. For FISCHER "100-96" "T" and "G" Models, a holder is necessary.



HOLDER

No.		Code
3553A	Adjustable filters in aluminum frame	SAFHH
3556	Holder for Adjustable Filters	TIOAB
3557	Adjustable filters and holder	TIOCO
3561	Cone shaped adapter for supporting Cat. No. 3557 Filters and Holder to FISCHER Model "100-96" unit	TIPKL

Leaded Glass

Leaded glass, for use as protection in cabinets and for shields. Extra heavy thickness, containing about 30 per cent lead.

No.		Code
391	Lead Glass, size 5 ″ x 7 ″, 3/16″ thick	GLOSS
392	Lead Glass, size 6½″ x 8½″, 3/16″ thick	GLUSI
394	Lead Glass, size 8 ″ x 10 ″, 3/16″ thick	GLYCI
395	Lead Glass, size 10 ″ x 12 ″, 3/16″ thick	GOADY
396	Lead Glass, size 11 ″ x 14 ″, 3/16″ thick	GOBLE
397	Lead Glass, size 12 ″ x 16 ″, 3/16″ thick	GOXEL
398	Lead Glass, size 14 ″ x 17 ″, 3/16″ thick	GESIX

Sheet Lead

Sheet Lead, 1/16 inch thick, for mounting on walls and doors of x-ray rooms, for protection of films, etc. May be obtained in widths up to 24 inches. Exact size should be specified when ordering. For example NOT "3 sq. feet" but rather "12 in. x 36 in." or "18 in. x 18 in.". A 12-inch square weighs approximately 3 lbs.

No.		Code
381	Sheet Lead, per lb.	GLOMU

Lead Protection Foil

No.		Code
380	Lead Foil, 6-inch width rolls contain from 2 lbs. 6 oz. to 4 lbs. 6 oz., per pound	GLOBE

X-RAY FILM MARKERS

(Film markers with name cut not returnable for credit.)



PERFECTION X-Ray Film Marker

A light weight aluminum film marker. Your name and address in raised letters, mounted on upper and lower edges. Numbers and letters are securely fastened on celluloid strips, and may be replaced from either end.

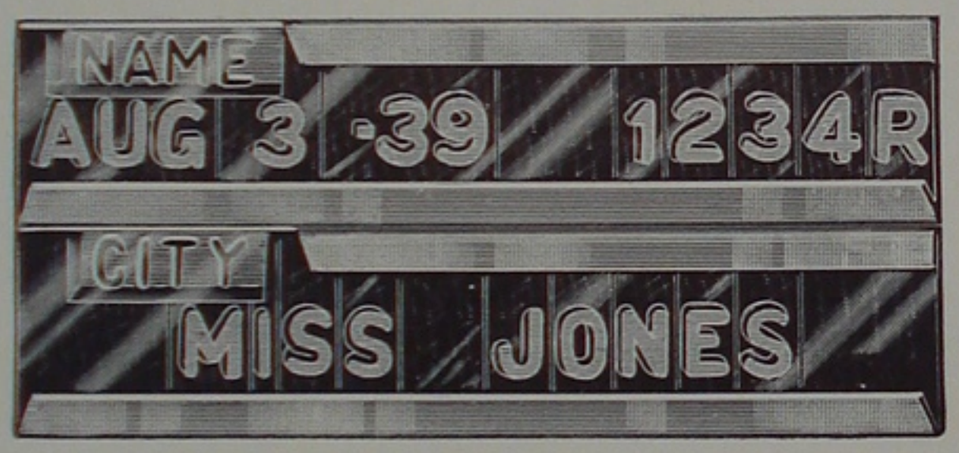
No.		Code
3468	Perfection X-Ray Film Marker, with 4 sets of ¼ inch figures and one each R and L, in wood case	GYROS
3466	Set of Months and Dates	GYMMA
3469	Perfection Marker only (lettered)	UBERO



ECLIPSE CUSHION Film Marker Set

Composed of rubber pad securely fastened between two strips of bakelite. Name and address cemented under top strip of bakelite, as shown. Concealed but show distinctly on film.

No.		Code
4695	Set consisting of: 1—Cushion type marker with your name and address. 4—Each ¼" figures 0 to 9 on WHITE FIBERLOID. 1—Each ¼" letters R and L on WHITE FIBERLOID. 1—18 Compartment Improved Type Case	TILTL
4696	1—Months and Dates Set as illustrated	TILUK
4697	FIGURES Mounted on WHITE FIBERLOID	TILWJ
4698	Cushion Type marker with name and address	TILXH
4699	Blank Cushion type marker	TILYG



IDEAL CUSHION Film Marker Set

Recommended to protect patients' interests when taking radiographs that may be used for legal purposes. Be sure that the NAME, DATE and CASE NUMBER are placed on the film at the time the radiograph is taken. (Do not write on film after exposure). Name and address cemented under top strip of bakelite as shown, concealed but show distinctly on film.

No.		Code
4700	Set consisting of: 1—Double Cushion type marker with your name and address. 4—Each 3/16" Figures 0 to 9 on WHITE FIBERLOID. 1—Each 3/16" Letters R and L on WHITE FIBERLOID. 2—Each 3/16" Letters A to Z on WHITE FIBERLOID. 1—Each 3/16" Letters A-E-I-O-U on WHITE FIBERLOID. 1—36" Compartment Improved Type Case	TILZE
4701	1—Months and Dates Set as illustrated	TIMAS
4702	1—Months and Dates Set in figures only (8-3-39)	TIMBR
4703	Cushion type marker with name and address	TIMCP
4704	Figures or letters mounted on WHITE FIBERLOID	TIMDO





Wheel Marker with Month and Date Attachment

Any name not having more than two lines of more than 20 letters, may be cut in the top section of wheel marker. The four wheels may be manipulated to show any number up to 9999. A fifth wheel is provided with letters "R" and "L" so that the right and left may be plainly marked. Advise, when ordering, the exact lettering to be cut in top section. Month and date container fastens securely to end of wheel marker.

No.		Code
572	1—4 Wheel Improved type wheel marker to number from 1 to 9,999 with month and date attachment, complete with months and dates (as illustrated)	TIMFL
571	1—Attachment as illustrated, with months and dates set attached to your old marker	TILSN
570	1—4 Wheel Improved marker (contains lead insert)	FAMES
4705	Extra Mounted 3/16" figures on WHITE FIBERLOID for months and dates set	TIMEN

Lead Letters and Figures



Solid Lead Letters and Figures mounted on celluloid strips. May be obtained in complete set of numerals or alphabet, or any amount or combination desired. Triangular or flat face letters as desired.

No.		Code
3475	Lead Letters, 3/16 inch high	ULECT
3476	Lead Letters, ¼ inch high	ULEXI
3477	Lead Letters, 5/16 inch high	ULOCA
3478	Lead Letters, ⅜ inch high	ULOID
3479	Lead Letters, ½ inch high	ULTEX

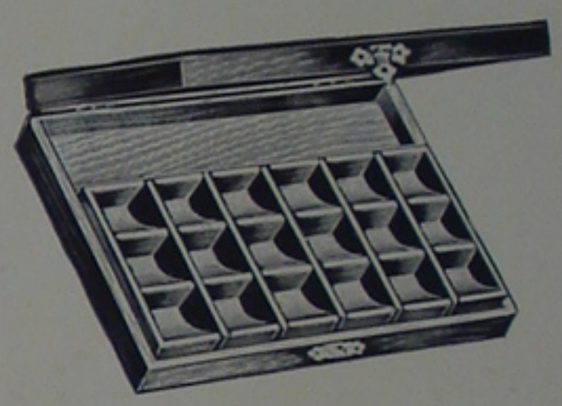
No.		Code
3480	Lead Numerals, 3/16 inch high	UMBON
3481	Lead Numerals, ¼ inch high	UNCIA
3482	Lead Numerals, 5/16 inch high	UNCOM
3483	Lead Numerals, ⅜ inch high	UNGUA
3484	Lead Numerals, ½ inch high	UNIFO

(If flat face letters are desired, as shown in smaller illustration, simply add letter "A" to catalog numbers when ordering, as 3475A. Unmounted letters or numerals, 3c each.)

Lead Letter and Figure Case

A necessity for filing lead letters and figures. Cases made of steel. Available with eighteen or with thirty six compartments.

No.		Code
3487A	18-Compartment Case	TIRBE
3488A	36-Compartment Case	TIRGC

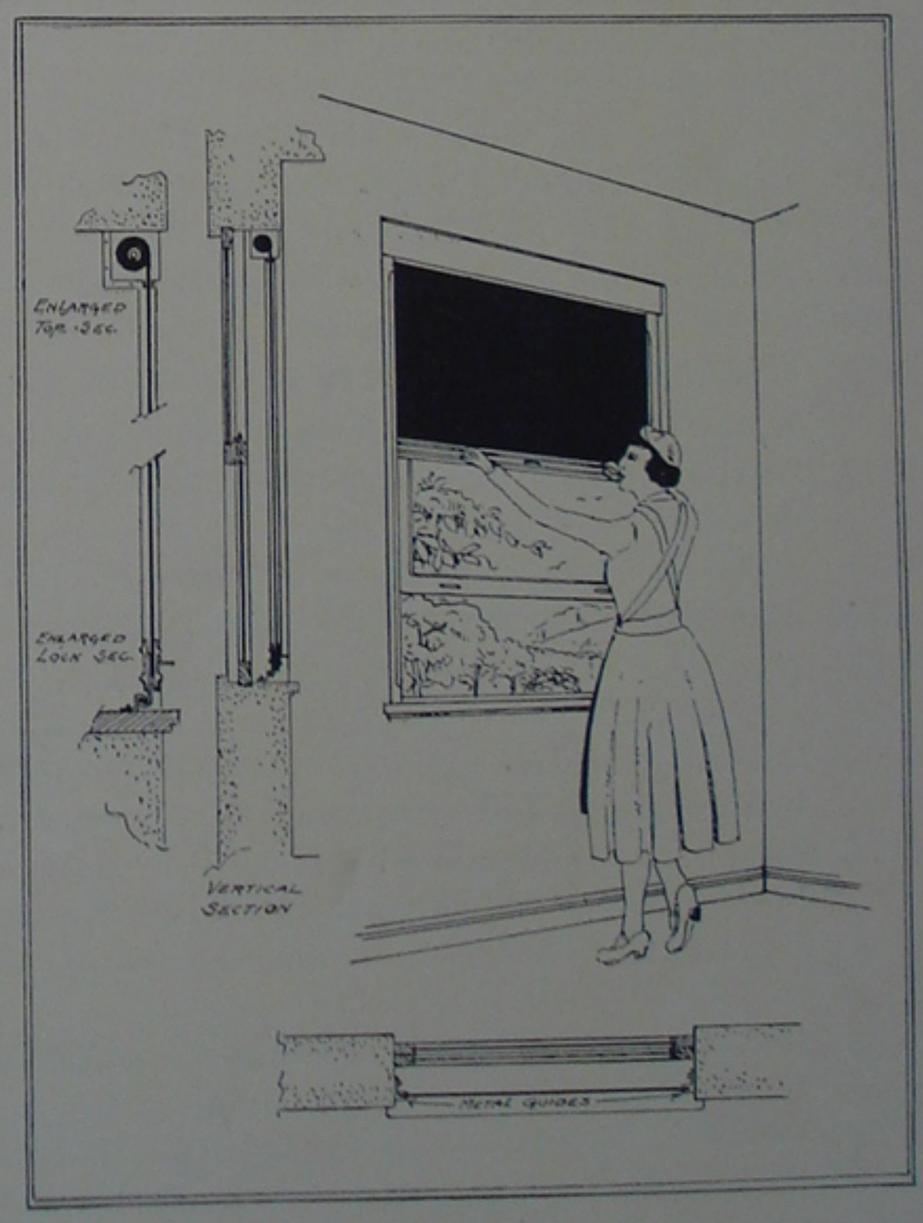


The ST. CLAIR Light-Proof Shade

Solves the problem of attaining absolute darkness in x-ray and photographic departments. Material used is flexible, permitting shade to be raised or lowered easily. No danger of warping, cracking or fraying. Will not rattle. Shade glides snugly between narrow metal guides placed at the sides of the window frame. A patented locking arrangement at bottom, running whole width of window sill, holds shade down securely, prevents mishaps, and seals out even the faintest streaks of light.

Can be mounted inside jamb, or outside of casing. Exact size and shape of opening to be covered must be given—to smallest fraction of inch. Quotation will then be made. Color black or special, at small additional cost. Write.

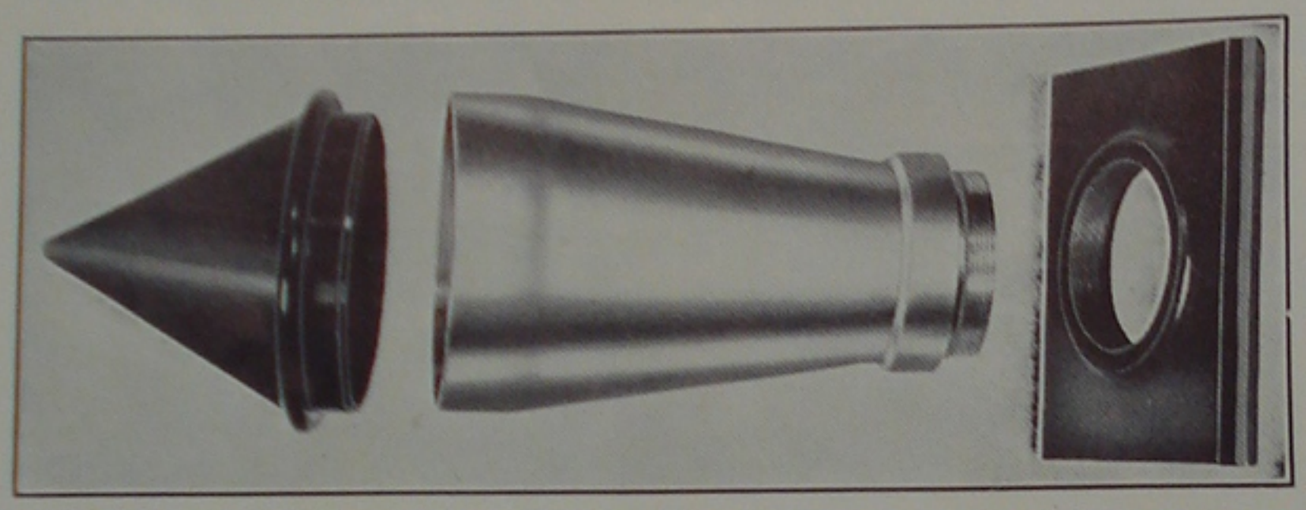
No.		Code	Price
3494	The ST. CLAIR Light-Proof Shade	UROBI	Depends on Size



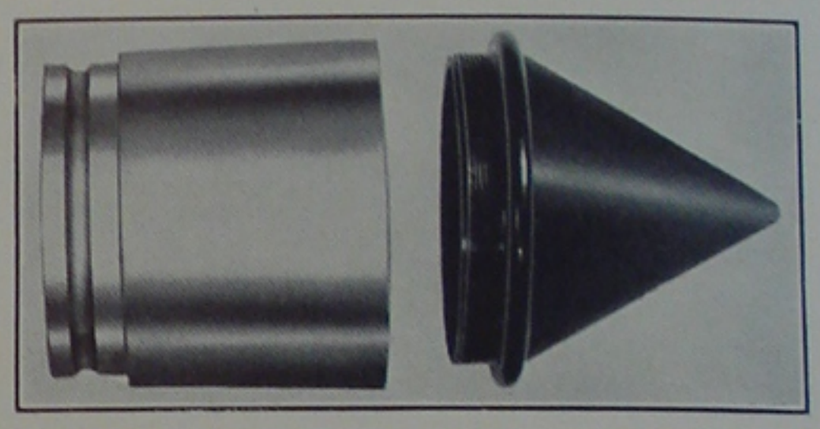
FISCHER Radiographic Cones



No.		Code
2413	Black fibre tube, diameter 2¼ inches, length 9½ inches, with metal end ring to fit No. 3586A adapter	ZIFFO
2244	Pointed aluminum cone to fit fibre tube No. 2413	ZIHFE
3586A	Metal adapter for fibre tube No. 2413 to hold tube to "60-88", "SP-60", "DS-60" and "100-100" models	FILUM
3585	Dental cone complete for "60-88", "SP-60", "DS-60" and "100-100" models—including Nos. 2413, 2244, 3586A	FILOP



3922 3920 3926



3921 3922

No.		Code
3920	Aluminum Adapter for Bakelite Cone for No. 3922 for Shockproof "DENTAL-X" and "DSP-20"	YABAA
3922	Bakelite cone only for Aluminum Adapter No. 3920 for Shockproof "DENTAL-X" and "DSP-20"	YABDO
3924	Complete cone for Shockproof "DENTAL-X" including Aluminum Adapter No. 3920 and Bakelite Cone No. 3922	YABOD
3926	Iron base only to adapt Aluminum Cone Adapter No. 3920 to "DSP-20"	YABRY
3928	Complete Dental Cone assembly for "DSP-20" including Aluminum Adapter No. 3920, Bakelite Cone No. 3922 and Iron Base No. 3926	YACCY
3589	Bakelite Cone 3922 fitted with special Adapter No. 3921 to fit "DENTAL-X" (non-shockproof)	FIDAX
3921	Aluminum Adapter for Bakelite Cone No. 3922 for "DENTAL-X" (non-shockproof)	YABCC
3870	Lead lined compression cone 4½" for Shockproof "DENTAL-X"	SADBB
3871	Aluminum Adapter with filter for Shockproof "DENTAL-X" Cone No. 3870	SADCC
3872	Complete lead lined compression cone 4½" for Shockproof "DENTAL-X", consisting of Nos. 3870 and 3871	SADDD
3873	Aluminum Adapter (to connect holder No. 3926 to cone No. 3870)	SAFAA
3874	Aluminum Filter 2⅛" circle 1 mm. thick—fits adapter No. 3873	SAFAC
3931	4½" Lead Lined Cone, No. 3870, with base, No. 3926, adapter No. 3873 and filter No. 3874—for "DSP-20" X-ray Outfit	SAFBB
4402	Bell type cone for use with FISCHER Model "H" X-Ray Unit — diameter 4 inches, length 3½ inches—affords full coverage of 14x17 inch film at a focal-film distance of 30 inches	TEAGH
4404	Bell type cone for use with FISCHER Model "G" X-Ray Unit — diameter 4 inches, length 3½ inches—affords full coverage of a 14x17 film at a focal-film distance of 30 inches	TEAHI
4344	Metal adapter designed to permit use of No. 3920 and No. 3922 as a dental cone with FISCHER Model "G" X-Ray Unit	TEPED
3927	Dental cone for use with FISCHER Model "G" X-Ray Unit—includes Nos. 3920, 3922 and 4344	TEDJK
4345	Metal adapter designed to permit use of No. 3920 and No. 3922 as a dental cone for use with FISCHER Model "H" X-Ray Unit	TEBFE
3925	Dental cone for use with FISCHER Model "H" X-Ray Unit—includes Nos. 3920, 3922 and 4345	TEDIJ

FISCHER Radiographic Cones—Continued

No.		Code
3638	Lead Lined Compression Cone—5 inches long—sized in diameter that an 8 inch circle is exposed on the x-ray film at a 25 inch target-film distance. For Fischer "DSP-20" model only	HISOS
2417	Lead Lined Compression Cone—5½ inches long—sized in diameter that a 9 inch circle is exposed on the x-ray film at a 25 inch target-film distance. For FISCHER "60-80", "SP-60", "DS-60" and "100-100" shockproof models only	GARAM
2416	Lead Lined Compression Cone—5½ inches long, 6½ inches in diameter—for exposing a 13 inch circle on x-ray film at 25 inch target-film distance. For Fischer "60-88", "SP-60", "DS-60" and "100-100" shockproof models only	ZEVUR
2411A	Adapter for holding cones Nos. 2416 and 2417 in position on "60-88", "SP-60", "DS-60" and "100-100" shockproof models	TACTI

Cones for FISCHER Units with Oil Insulated Tubeheads

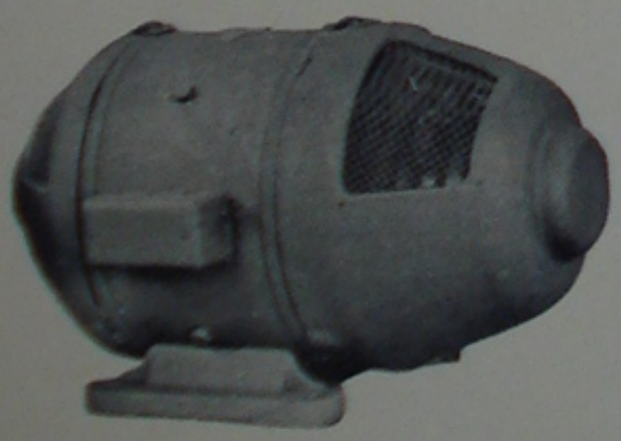
No.		Code
4735	Radiographic Cone, with heavy lead diaphragm, sized to expose a six inch diameter circle at 25 inch focal film distance; or a seven inch diameter circle at 30 inch focal film distance	TIPOM
4736	Radiographic Cone, same as No. 4735, sized to expose a ten inch diameter circle at 25 inch focal film distance; or a twelve inch diameter circle at 30 inch focal film distance	TIPPS
4737	Radiographic Cone, with heavy lead diaphragm, sized to expose a fifteen inch diameter circle at 25 inch focal film distance; or an eighteen inch diameter circle at 30 inch focal film distance	TIPSR
4738	Treatment Cone, with heavy lead diaphragm, sized to expose a one-half inch diameter circle at a 6 inch skin-focal distance	TIPTV
4739	Treatment Cone, with heavy lead diaphragm, sized to expose a one inch diameter circle at a 6 inch skin-focal distance	TIPVX
4740	Treatment Cone, with heavy lead diaphragm, sized to expose a one and one-half inch diameter circle at a 6 inch skin-focal distance	TIPXY
4741	Treatment Cone, with heavy lead diaphragm, for Fischer "DSP-20" unit, sized to expose a one inch diameter circle at a 6 inch skin-focal distance	TIPRE
4742	Adapter to accommodate Cones Nos. 4735 to 4740, inclusive, to FISCHER Model "T" and "G" units	TIJCZ



Paragon Fluoroscopic Goggles

This type of goggles is made of two layers of flexible material—one green and the other red—to fit the face like a mask. They can be worn over any type of glasses with perfect comfort.

No.		Code
3668	Paragon Fluoroscopic Goggles	TERAS



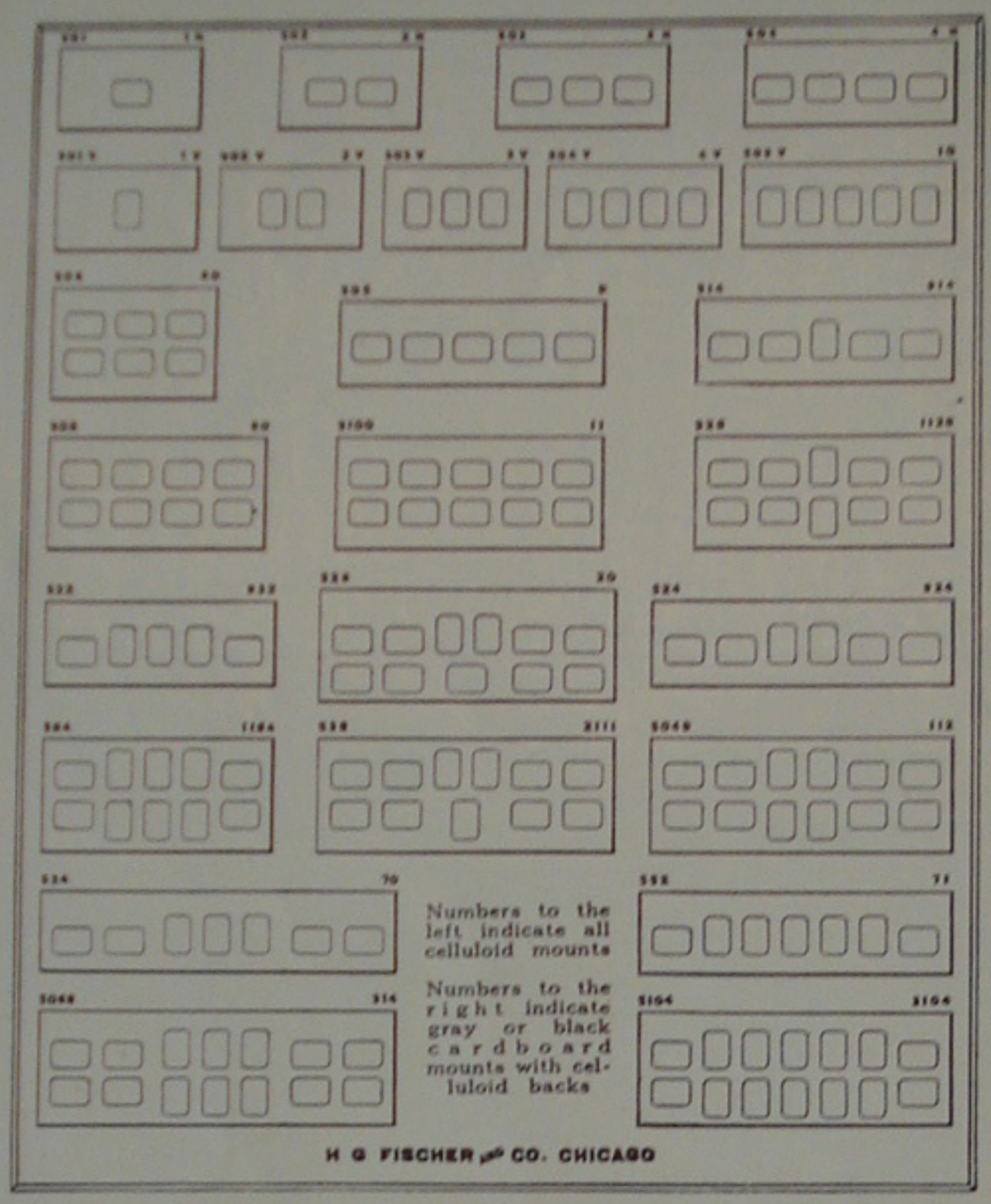
Rotary Converters

Descriptive details and prices on rotary converters, from 1000 to 10,000 watts, furnished on request.

GASOLINE Engines and Generators

Gasoline engines and electric generators can be supplied in varying sizes. Descriptive details and prices on request.

FILM MOUNTS



EEZEEMOUNTS

Made of three pieces of gray cardboard pasted firmly together. Yet they are thinner than wire-stitched mounts; hence they take up less space in the filing cabinet. No celluloid backing to blur clear vision.

Films slide to place with minimum effort; easier to mount than ordinary mounts.

When mounted, films are held in place on all four sides and cannot become dislodged.

GRAY CARDBOARD

WITH EITHER CLEAR OR FROSTED ACETATE (NON-INFLAMMABLE) BACKING, FASTENED TOGETHER BY MEANS OF WIRE STITCHES.

Be sure to use correct stock numbers when ordering; also, specify clear or frosted as desired. Guaranteed not to warp or wrinkle.

ALL CELLULOID (Inflammable) Mounts

Acetate material is not sufficiently strong in itself to be practical on this type of mount. Acetate will be made up to special order at user's risk at 25% additional cost.

IMPRINTING

$1.50 per order regardless of quantity or number of sizes ordered. Corner card on envelopes included when ordered with mounts; otherwise same charge applies.

BLACK BORDERS ON CELLULOID MOUNTS

Will be imprinted at additional cost of $1.00 per size regardless of quantity.

This is a needless expense and should be discouraged.

*** 1st line grey cardboard with frosted acetate backing.**
x 2nd line grey cardboard with clear acetate backing.

Stock No.	25	50	100
* 1H	$ .70	$1.20	$2.20
x C-1H	.60	1.10	1.90
† 501	.80	1.40	2.50
EZ-1H	.90	1.50	2.60
1V	$ .70	$1.20	$2.20
C-1V	.60	1.10	1.90
501V	.80	1.40	2.50
EZIV	.90	1.50	2.60
2H	$ .90	$1.50	$2.80
C-2H	.70	1.20	2.20
502	.90	1.60	2.90
EZ-2H	1.00	1.70	2.90
2V	$ .90	$1.50	$2.80
502V	.90	1.60	2.90
EZ-2V	1.00	1.70	2.90
3H	$1.00	$1.80	$3.30
C-3H	.90	1.60	2.80
503	1.10	2.10	3.90
EZ-3H	1.10	1.90	3.40
3V	$1.00	$1.80	$3.30
C-3V	.90	1.60	2.80
503V	1.10	2.10	3.90
EZ-3V	1.10	1.90	3.40
EZ-1-OCC	$1.60	$2.90	$5.50
Made only in EZ Mount for Film 2¼" x 3".			
4H	$1.20	$2.30	$4.40
C-4H	1.00	1.80	3.30
504	1.30	2.40	4.60
EZ-4H	1.30	2.40	4.50
932	$1.30	$2.30	$4.40
C-2V	.90	1.20	2.20
C-932	1.20	2.10	3.90
532	1.60	2.90	5.50
EZ-932	1.40	2.40	4.50
914	$1.40	$2.60	$4.90
C-914	1.20	2.10	3.90
514	1.60	2.90	5.50
EZ-914	1.40	2.60	4.90

Stock No.	25	50	100
9	$1.40	$2.60	$4.90
C-9	1.10	2.10	3.90
505	1.60	2.90	5.50
EZ-9	1.40	2.60	4.90
924	$1.50	$2.70	$5.20
C-924	1.30	2.30	4.40
524	1.80	3.40	6.60
EZ-924	1.60	2.90	5.30
70	$1.70	$3.20	$6.10
C-70	1.60	2.90	5.50
534	2.10	4.00	7.70
EZ-70	1.70	3.20	6.10
EX-2-OCC	$2.30	$4.30	$8.30
For Film 2¼" x 3" Made Only in EZ Mount.			
FOR No. 3 BITE WING FILMS			
23	$1.00	$1.80	$3.30
C-23	.90	1.50	2.80
5023	1.20	2.10	3.90
EZ-23	1.10	1.90	3.50
FOR No. 1 and No. 2 BITE WING FILMS			
922	$1.20	$2.30	$4.40
C-922	1.10	2.10	4.00
5232	1.60	2.90	5.50
EZ-922	1.40	2.60	4.90
FOR No. 1 and No. 3 BITE WING FILMS			
923	$1.30	$2.50	$4.80
C-923	1.10	2.10	4.00
523	1.60	2.90	5.50
EZ-923	1.40	2.60	4.90
FOR No. 1 and No. 2 BITE WING FILMS			
942	$1.80	$3.40	$6.60
C-942	1.70	3.10	5.90
5342	2.00	3.70	7.20
EZ-942	1.70	3.10	5.90

† 3rd line all frosted celluloid.
4th line EZ mounts all paper, no backing.

Stock No.	25	50	100
STEREOSCOPIC			
EZ-2H-S	$1.10	$1.90	$3.50
EZ-2V-S	1.10	1.90	3.50
Made Only in EZ Style Either Vertical or Horizontal.			
FOR No. 0 JUNIOR FILM			
EZ-1H-J	$ .90	$1.50	$2.60
Made Only in EZ Mount.			
EZ-2H-J	$1.00	$1.70	$2.90
Made Only in EZ Mount.			
60	$1.40	$2.60	$5.00
C-60	1.30	2.30	4.40
506	1.80	3.40	6.60
EZ-60	1.60	2.90	5.30
80	$1.80	$3.40	$6.60
C-80	1.70	3.20	6.10
508	2.30	4.30	8.30
EZ-80	1.90	3.50	6.70
1164	$2.30	$4.30	$8.30
C-1164	1.80	3.40	6.60
564	2.40	4.50	8.80
EZ-1164	2.30	4.30	8.30
1128	$2.30	$4.30	$8.30
C-1128	1.80	3.40	6.60
528	2.40	4.50	8.80
EZ-1128	2.30	4.30	8.30
314-22	$3.50	$6.70	$13.20
C-314-22	2.90	5.60	11.00
5068-22	3.70	7.10	14.00
Not Made in EZ, — See EZ 714-22.			
11	$2.30	$4.30	$8.30
C-11	1.80	3.40	6.60
5100	2.40	4.50	8.80
EZ-11	2.30	4.30	8.30
20	$2.40	$4.50	$8.80
C-20	2.20	4.00	7.70
529	2.70	5.10	9.90
EZ-20	2.40	4.50	8.80

Stock No.	25	50	100
2111	$2.50	$4.80	$9.40
C-2111	2.20	4.00	7.70
538	2.70	5.10	9.90
EZ-2111	2.40	4.50	8.80
112	$2.70	$5.10	$9.90
C-112	2.40	4.50	8.80
5048	2.70	5.10	9.90
EZ-112	2.60	4.90	9.50
314-23	$3.50	$6.70	$13.20
C-314-23	2.90	5.60	11.00
5068-23	3.70	7.10	14.00
Not Made in EZ, — See EZ 714-23.			
314	$2.90	$5.60	$11.00
C-314	2.60	4.90	9.50
5068	2.90	5.60	11.00
EZ-314	2.80	5.40	10.50
3104	$2.90	$5.60	$11.00
C-3104	2.60	4.90	9.50
5104	3.20	6.10	12.00
EZ-3104	2.90	5.60	11.00
316	$3.50	$6.70	$13.20
C-316	2.90	5.60	11.00
Not Made in All Celluloid. Not Made in EZ Mount.			
FOR JUNIOR FILMS			
314-J	$2.90	$5.60	$11.00
C-314-J	2.60	4.90	9.50
5068-J	2.90	5.60	11.00
EZ-314-J	2.80	5.40	10.50
314-42	$3.70	$7.10	$14.00
C-314-42	3.30	6.40	12.50
5068-42	3.90	7.60	15.00
Not Made in EZ, — See EZ 716.			

X-RAY BOOKS

(Not Returnable For Credit)

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3429	The Chest in Children. 432 pages. E. Gordon Stoloff	GIRTH
3430	The Chest Roentgenologically Considered. 561 pages. Sante	GLABE
3408	Clinical Roentgen Pathology of Thoracic Lesions. W. H. Meyer	GASSE
3426	Gynecological Roentgenology, 571 pages. Julius Jarcho	GIMBE
3409	Injuries and Diseases of Bones and Joints. Baetjer and Waters	GAULT
3410	Intracranial Tumors Roentgenologically Considered. 225 pages. Loyal Davis	GAVAG
3411	Lobar Pneumonia. Leroy Sante	GAYAT
3432	Mastoids Roentgenologically Considered. Second Edition. 194 pages. Frederick M. Law	GLIOS
3431	Nasal Accessory Sinuses. Roentgenologically Considered. 239 pages. Frederick M. Law	GLAND
3413	Peptic Ulcer (Clinical Roentgenology). Buckstein	GELAT
3414	Physics of Radiology. J. L. Weatherwax	GELYS
3415	Pneumoconiosis (Silicosis). Pancoast and Pendergrass	GEMIN
3416	Radiologic Maxims. Swanberg	GEMMA
3417	Radiological Study of Para-Nasal Sinuses and Mastoids. Granger	GENAL
2317	Radiography of the Chest (Vol. II Non-Tuberculous Affections). 196 pages. Walker Overend	VUMAN
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2318	Roentgen Interpretation. 4th edition. 339 pages. George W. Holmes and Howard E. Ruggles	VIMOX
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3420	Roentgenology. Alban Kohler	GEOFO
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3421	The Duodenum. Edward L. Kellogg	GERAN
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2767	Holliday—"Dental Radiology Handbook." 1935 edition	DAFBA
2766	Sante—"Manual of Radiological Technique." 1940 edition	DAFAB
3406	A Descriptive Atlas of Radiographs. 4th edition. Bertwistle	GARRO
2352	Outline of Roentgen Diagnosis. Leo Rigler. Atlas edition	TIAYZ
2353	Outline of Roentgen Diagnosis. Student's edition	TIBAA
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Further, your local carrier's agent should at once be notified and have the damaged goods inspected. Neglect in complying with this rule places the responsibility entirely with the consignee in case claim is refused.

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Guarantee Any defects in our apparatus that may develop within (6) months from date of shipment under normal and proper use, due to faulty material, imperfect insulation, or ineffective workmanship, will be repaired or replaced at our expense, provided such apparatus is delivered *prepaid* to our factory.

For repairs or replacements during the next twelve (12) months, we will charge only actual cost to cover, and after this period our service and our attention are to be called on when required, with the understanding that charges for overhauling "FISCHER" apparatus will always remain as near actual cost as possible.

We will not assume any liability for work done by others, without our consent in writing, nor for defects from improper storage.

We will not assume any liability for breakage of glassware, nor for deterioration of rubber goods, x-ray films or any perishable goods. We can but use the best materials obtainable.

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No merchandise will be returnable for credit after having been in customer's possession fifteen (15) days or more.

No merchandise will be returnable for credit except upon written request of purchaser, and then only with our consent.

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And last, but very important, *never* fail to place *your name and address in and on* the box or parcel when shipping to us.

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All orders for $1.00 or under should be accompanied with stamps, money order or check.

Our prices are subject to change without notice.

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X-Ray Apparatus — Dental — Wall Model 16
X-Ray Apparatus Model "G" Portable 15
X-Ray Apparatus Model "GA-15" 14
X-Ray Apparatus Model "GF" 12
X-Ray Apparatus Model "GM" 13
X-Ray Apparatus Model "HA-10" 14
X-Ray Apparatus Model "TC" 10
X-Ray Apparatus Model "TF" ..... 8 and 9
X-Ray Apparatus Model "TM" 11
X-Ray Apparatus Model "100-96" ..... 6 and 7
X-Ray Apparatus Portable Model "G" 15
X-Ray Apparatus Portable Model "H" 15
X-Ray Tubes 25

Form No. 1977A

Printed in U. S. A.


H. G. Fischer
& CO.
CHICAGO, ILL.

Instruction Booklet for MOTOR - and - PUMP

H. G. FISCHER & CO.

2341-43 Wabansia Ave. CHICAGO, ILL.

Instructions for the proper operation of the MOTOR AND PUMP FEATURES of the Thompson & Plaster Electrical Cabinets

TO OPERATE FLUID HEATER

Press *red* button on the Heater Switch at the back of top of the cabinet. This illuminates the bottles with a red glow, and after a very short period the contained liquids will become warmed to body temperature. The object is to prevent the resulting chill of a cold spray upon the tissues or sensitive wound under treatment.

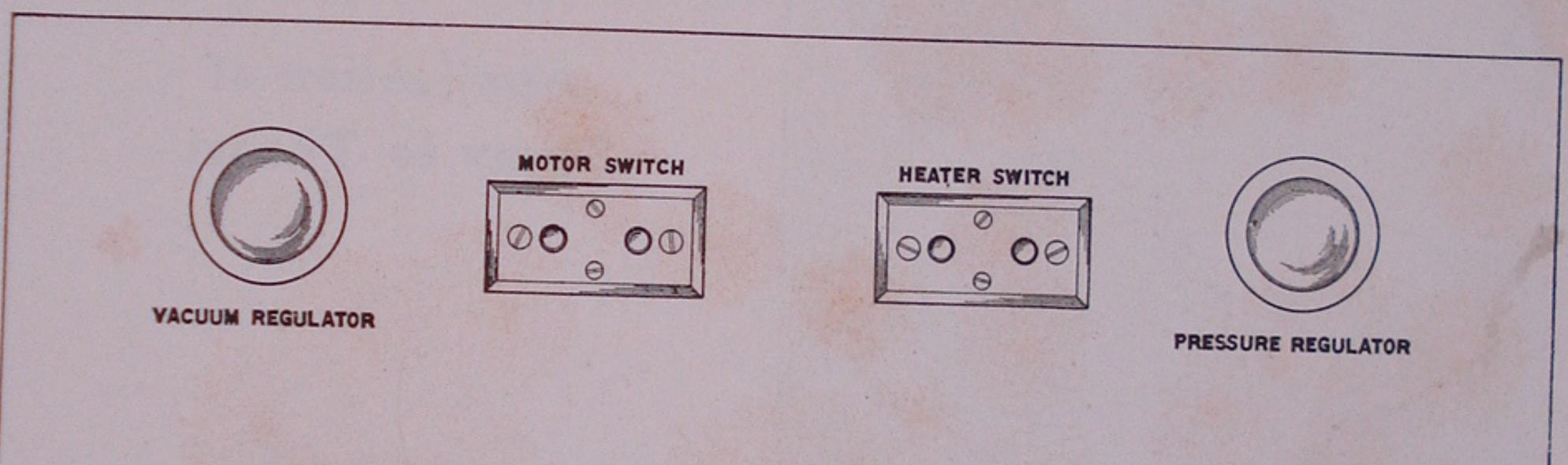
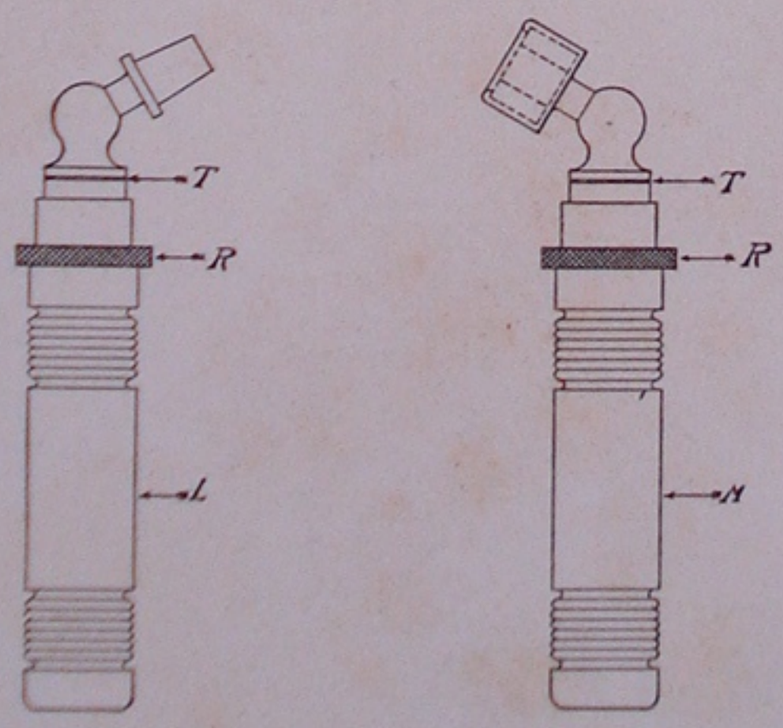


Diagram of Controls

TO OBTAIN AIR PRESSURE

To obtain Pressure to operate the Nebulizers, Atomizers, etc., press *white* button on switch marked Motor.



Pressure and Vacuum Handles

Set pointer on pressure regulator to farthest point on plate marked Pressure. Attach Spray Bottles to the tapered end of pressure handle "L" on right side of cabinet. To operate Con-

trol Valve on handle to obtain various degrees of Pressure, see handle diagram; the knurled collar "R" is turned to the right to increase power, and to the left to decrease. To relieve pressure instantly, pull collar "R" down.

Always make it a point to have the *valve* in the Pressure handle *open when starting motor.*



Application of Spray to Throat



Applying Eustacheon Tube Opener

VACUUM To obtain Vacuum for using the various Cupping devices, start Motor same as for Pressure. Set indicator on Vacuum Regulator to farthest point marked Vacuum. Attach the cups by pressing into the rubber bushing in the handle with a slight turning movement. The handle is controlled same as on the Pressure side, having the same quick release of Vacuum by pressing down collar "R."

The Handle "M" is arranged to separate at point "T," for inserting gauze or cotton when the Vacuum is to be used for extracting Pus or other similar substance from boils, etc.

Vacuum and Vibration

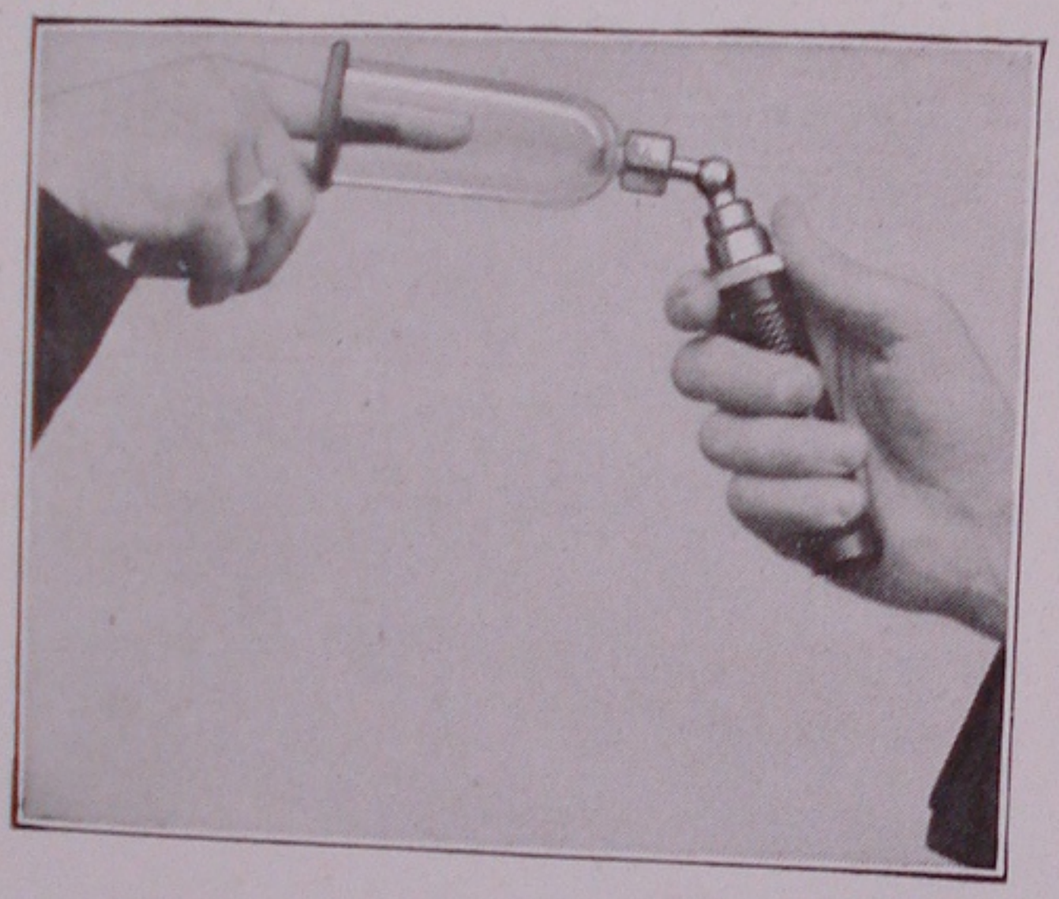


The Glass Vacuum cups Nos. 1500A, B, and C are for use over smooth flat surfaces, and the flexible Rubber attachments Nos. 1555 and 1556 will be found very desirable where edges and angles are encountered. Any devices ever gotten up by Dr. Bier can be attached to the Vacuum handle the same way.

No mistake can be made in making connections with either the Pressure or Vacuum Handles, as Vacuum attachments will not fit the Pressure Handle, and vice-versa.

VACUUM AND VIBRATION By turning Vacuum Regulator to farthest point toward Vibration, you will find that although there is still some sucking effect, it pulsates rapidly. By turning this same button to right or left any degree of Vacuum or Vacu-Vibration may be obtained.

Vacu-Vibration is indicated wherever a superficial local hyperemic condition is desirable.



Application of Vacuum and Vibration with Panaris Cup

PNEUMATIC VIBRATION Place either Surface Vibratodes, Nos. 1550, 1551, or 1552 on to the tapered end of the pressure handle "L." Turn the indicator to Vibration. Start motor as before, and adjust length and strength of vibratory stroke by means of handle control collar "R."

When using the Cavity Vibratodes care should be exercised that the small holes near the end, where the applicator is fastened to the handle, are not all closed at the same time. These are vent holes to allow some of the air to escape, and to prevent the caps from bursting under too much pressure. Should more pressure be desired to inflate any of the vibratodes to a greater extent, gradually turn regulator from Vibration to the Pressure side, until the right amount of expansion is obtained.

For extremely heavy vibration we have made up an Air Hammer with a full set of applicators, which you will find illustrated and described on page 22



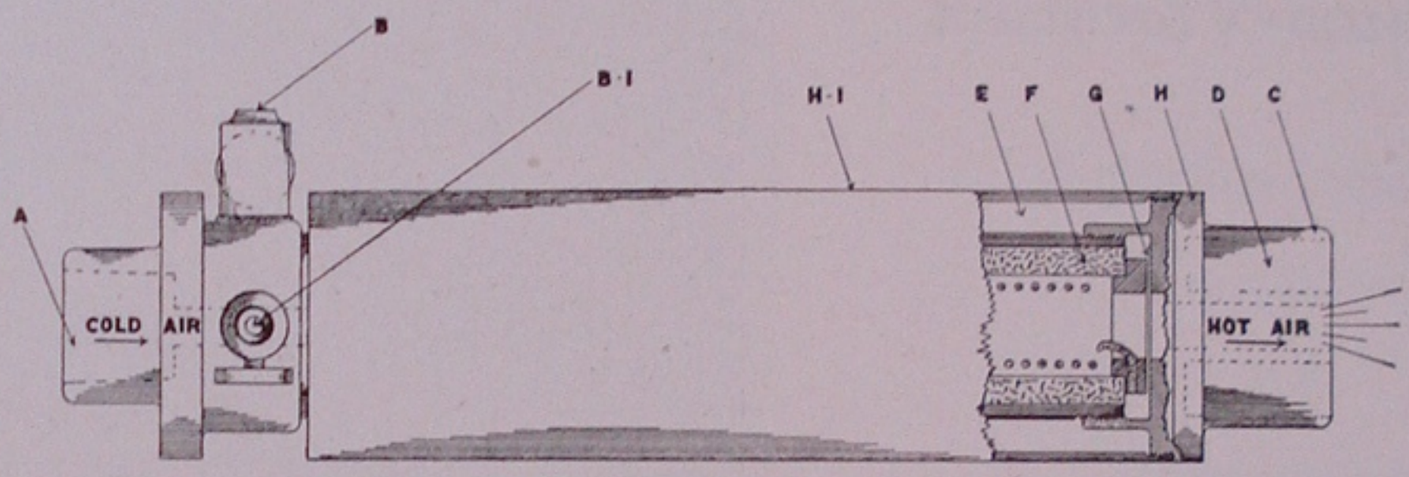
Pneumo-Vibration



Heavy-Vibration with Air Hammer Vibrator

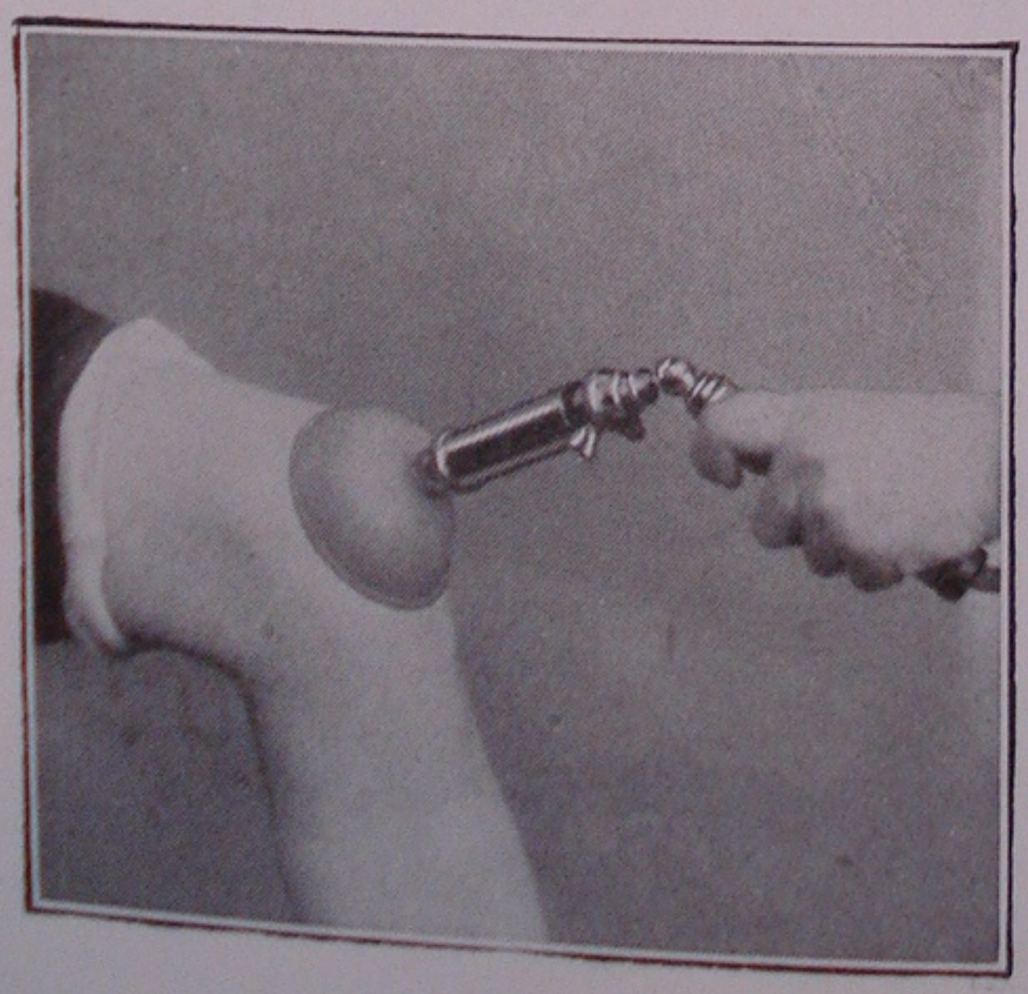
HEATED AIR

To obtain Heated Air, connect the tapered end of handle "L" to the tapered socket "A" (on air Heater diagram), leaving the binding posts in any convenient position. Now connect the heavy Cautery Cords to posts "B" and "B1," and to the Cautery Posts on the Cabinet. This Cautery Circuit is of very low voltage, and there is absolutely no danger of any electrical shocking, either to the operator or patient.



No. 1570 Air Heater

Next start the motor, set indicator to Pressure, and allow air to pass through heater. Operate the Cautery Current the same way as instructed to heat the Cautery Knives. It may seem necessary at the start to use the full power of the circuit to generate the desired heat, but after a moment you will find that a sufficient temperature may be maintained on button 6 or 7.



Application of Heated Air and Vibration to Knee

The Air Spreading attachment No. 1572 is arranged to screw into the heater, and is provided with outlet holes on the sides only, to prevent a concentrating of the heat on any one small section of the part under treatment, which would result if the air were allowed to pass straight through. You will find, as a result, that when rubber cups No. 1555 or 1556 are slipped on, the outer edge will get just as warm as the center. When through with heater, *shut off current first;* then shut off air.

You will readily see that with the above method the Heat as well as the Volume of air is under positive control at all times.

Continued contraction and expansion caused by the repeated heating and cooling is apt to loosen the heat unit "F." When this occurs, and heater fails to work, tighten the unit by holding fast the binding post end, and screwing tight the tube "H." (See Heater Diagram.)

A—Socket for Air connection.
B—and B1—Binding posts for Electrical Connections.
C—Support for Air Spreader and Rubber Cups.
D—and E—Air chambers to keep outer walls cool.
F—Heating Element.
G—Contact point.
H—Knurled edge to hold when removing Element.
H1—Outer chamber cover.

Our endeavor in designing this heater has been to make it as small and simple as is consistent with the life of a coil necessary to furnish the required amount of Heated Air. Both Quantity and Heat of Air are easily and independently adjusted to any degree. Every Heating Element is given a thorough test before shipping, and if instructions are carried out as above the coil will give excellent service for a long period of time.

New heating units can be purchased at 75 cents each, post-paid. No other Heating Element on the market is sold at such a reasonable figure, nor can be so readily renewed.

MOTOR AND PUMP The paramount feature of any piece of revolving or oscillatory mechanism is to keep it lubricated. In the Thompson Plaster Pump this matter becomes a simple one for the operator to attend to, as the entire system is lubricated from *one grease cup,* conveniently situated.

Grease cup No. 16 should be filled with the grease supplied with the machine. To fill, unscrew the knurled cap and screw back the leather piston all the way. Fill the cup and re-insert the piston, screwing cap tight. A half turn of the cross handle will feed grease to all parts of the pump. We suggest a *full turn* for every *hour's run.*

The motor needs attention only after six months' use, and where outfit is not used extensively, once each year will suffice.

TO OIL MOTOR Tip the cabinet backward, leaving an open space large enough to operate a screw driver. Remove plate No. 44. Now remove the cups No. 42, and after cleaning in benzine, refill and replace, being careful to get the wick back in the center so that it will reach the shaft.

Should the operator prefer to oil the motor without lifting the Cabinet, this can be done by using a good light motor oil and putting a few drops in the oil holes on top and at each end of the motor shaft. It will be necessary to repeat this latter oiling often, and we suggest a few drops for every three hours' run. Filling the grease cup is the better method.

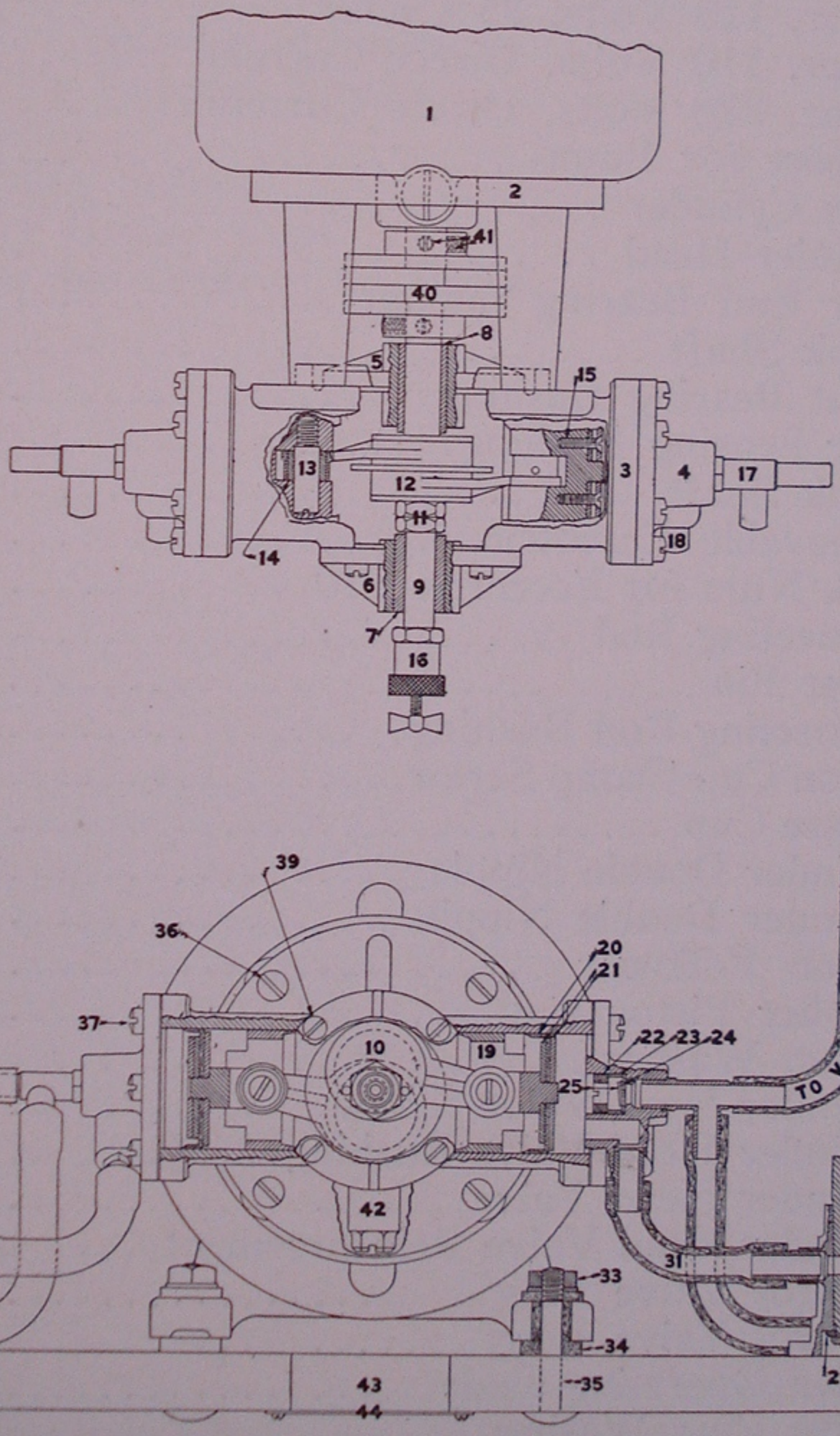
MOTOR AND PUMP CONSTRUCTION A great deal of care was exercised in the design of the Thompson Plaster Motor and Pump, and a product of smooth, noiseless, efficient, and powerful construction is the result.

The finest Bronze in the country is used in the Bearings and Piston Connecting Rods, insuring long life.

A smooth working Leather Link coupling makes the Direct connection between motor and pump.

No Belts, no Gears, no Chain, but Positive direct drive of Noiseless construction. (See No. 40.)

The Valves are Positive, and are readily replaced if necessary.



Sectional Views: Motor and Pump

REPLACING PARTS Should any piece prove faulty or defective at any time, order by *name, number and code.* Parts are all made interchangeable, and instructions for attaching will accompany each piece called for.

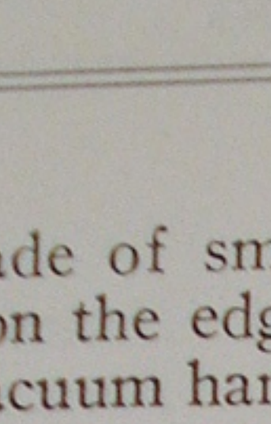
No.		Code
P1	—Motor, 110 Volts, 60 Cycles	*Pace*
	Motor, 220 Volts, 60 Cycles	*Pacha*
	Motor, 110 Volts, 25 Cycles	*Paddle*
	Motor, 110 Volts, Direct Current	*Paddy*
	Motor, 220 Volts, Direct Current	*Padre*
P2	—Support for Pump	*Pagan*
P3	—Main Cylinder	*Pain*
P4	—Cylinder Head	*Palate*
P5	—Rear End Bearing Support	*Pallet*
P6	—Crank Shaft	*Palma*
P7	—Front Bearing Bushing	*Palsy*
P8	—Rear Bearing Bushing	*Pamir*
P9	—Crank Shaft	*Panak*
P10	—Removable Eccentric	*Pandur*
P11	—Lock Nuts for Eccentric P10	*Panic*
P12	—Connecting Rod	*Panjab*
P13	—Wrist Pin	*Pantry*
P14	—Connecting Rod Bushing	*Papaw*
P15	—Piston Cup Clamp Screw	*Papist*
P16	—Grease Cup	*Papula*
P17	—Cylinder Double Nipple	*Parade*
P18	—Cylinder Double Nipple	*Pargon*
P19	—Piston Follower	*Parcel*
P20	—Leather Piston Cup	*Parch*
P21	—Piston Washer	*Pardon*
P22	—Cylinder Head Valve Screw	*Parry*
P23	—Cylinder Head Valve Bushing	*Passee*
P24	—Cylinder Head Valve	*Pastor*
P25	—Cylinder Head Valve Reinforcement	*Patent*
P26	—Control Valve Plug	*Pathos*
P27	—Control Valve Body	*Patio*
P28	—Valve Operating Body	*Peace*
P29	—Valve Plug Washer	*Pearl*
P30	—Valve Plug Screw	*Peavey*

PARTS-Continued

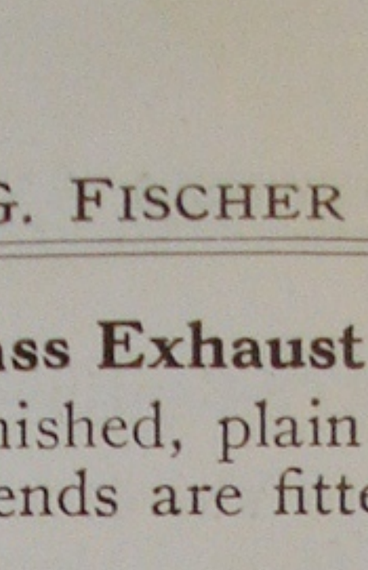
P31—Rubber Connection to Valve.....*Pecan*
P32—Rubber Connection from Valve.....*Pectan*
P33—Motor Bolt Nut.....*Pedant*
P34—Rubber Dampening Cushions.....*Pekann*
P35—Motor Bolts .....*Pelion*
P36—Screw for Attaching Pump.....*Pelota*
P37—Cylinder Head Screw.....*Pencil*
P38—Valve Control Rod Screw.....*Penury*
P39—Bearing Support Screws.....*Pepper*
P40—Coupling .....*Pepsin*
P41—Coupling Screw .....*Perdue*
P42—Motor Grease Cups.....*Period*
P44—Cover for Grease Cup Holes.....*Person*

Glass Exhaust Cups

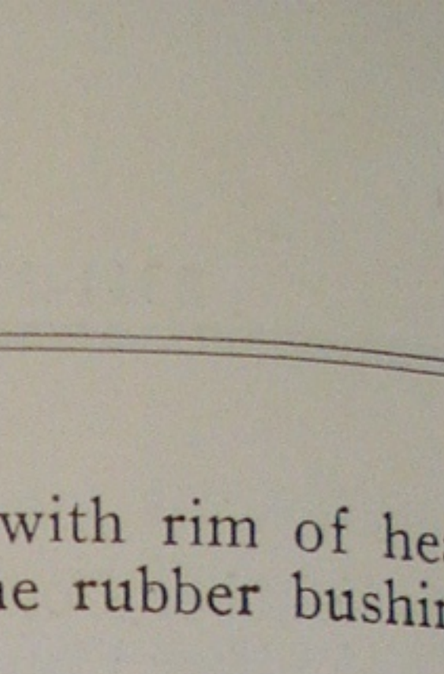
Made of smoothly finished, plain glass, with rim of heavier glass on the edge. The ends are fitted to the rubber bushing in the Vacuum handle.



No. 1500 A



No. 1500 B

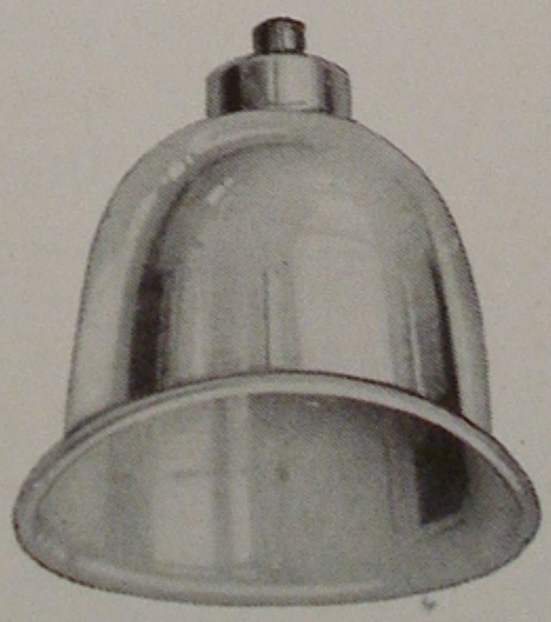


No. 1500 C

No.		Code	Price
1500A—Vacuum Cup, 1	in. diameter	*Jeloy*	$0.25
1500B—Vacuum Cup, 1½	in. diameter	*Jervin*	.25
1500C—Vacuum Cup, 2	in. diameter	*Jesuit*	.25



No. 1507



No. 1505



No. 1508

1505—Glass Breast Cup	*Jigger*	1.00
1507—Glass Panaris Cup	*Joint*	.35
1508—Glass G. U. Tube	*Joule*	1.00

Glass Exhaust Cups-Continued



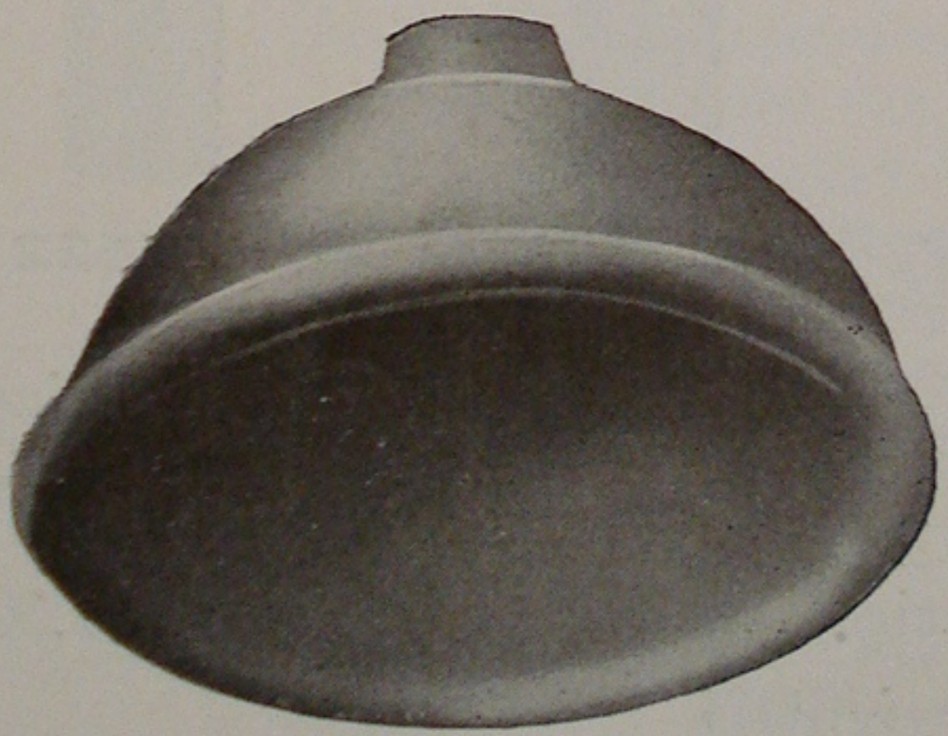
No. 1507 R



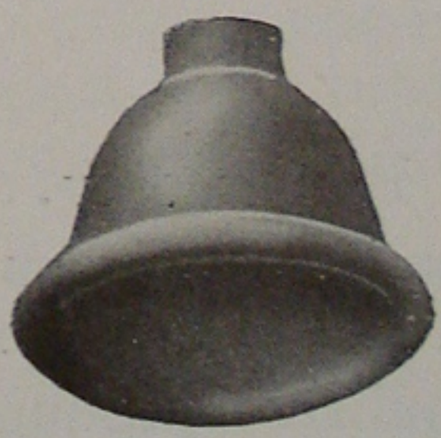
No. 1508 R

No.	Code	Price
1507R—Soft Rubber Panaris Casing	*Jolly*	.25
1508R—Soft Rubber G. U. Casing	*Jugal*	.25

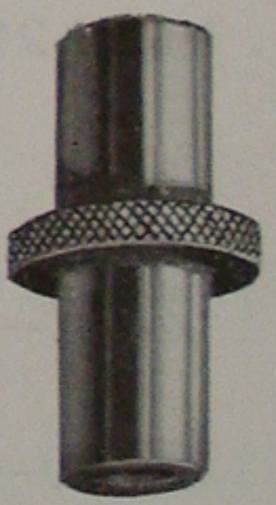
Rubber Vacuum Cups



No. 1556



No. 1555



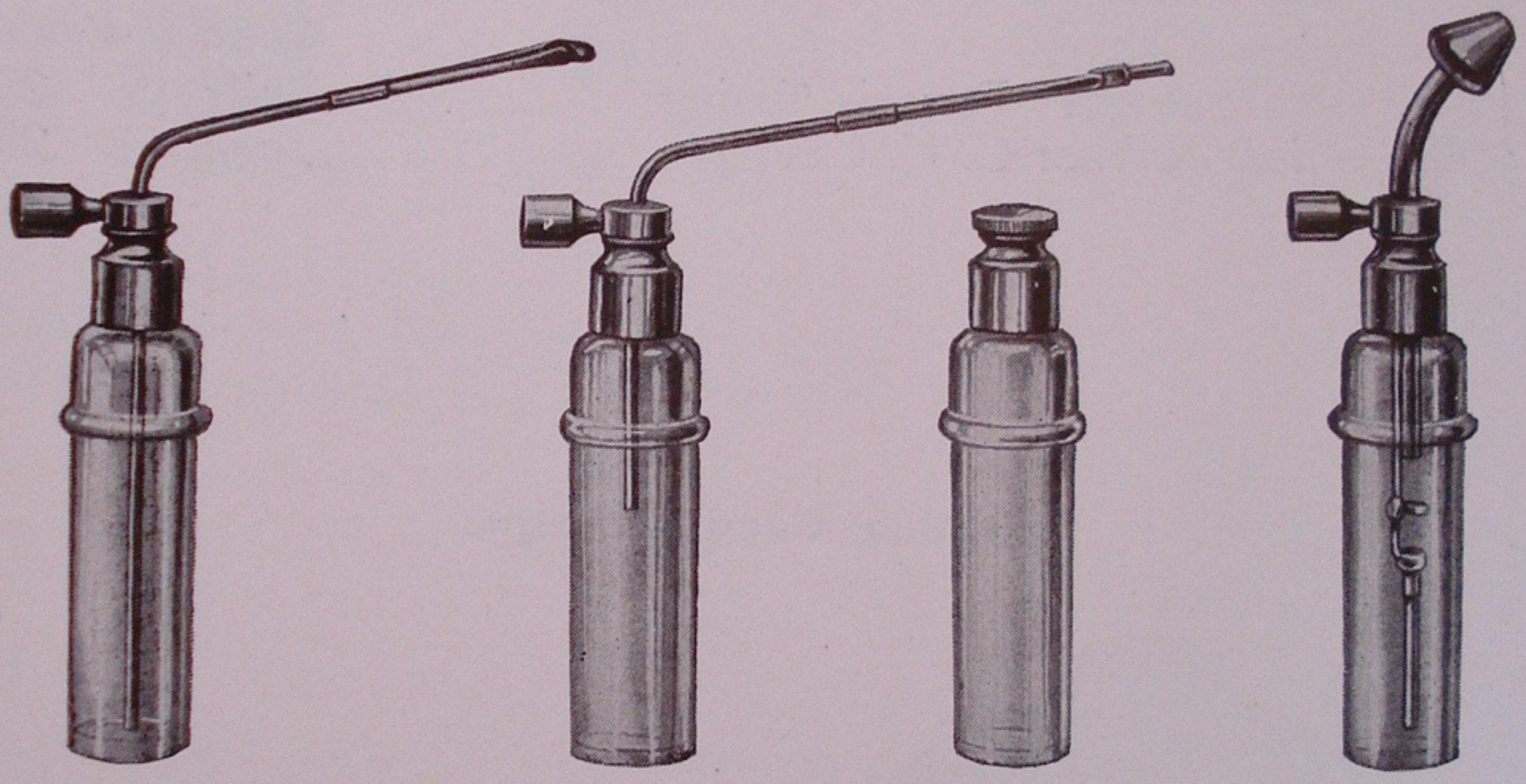
No. 1573

1555—Flexible Rubber Vacuum Cup	*Kale*	.35
1556—Flexible Rubber Vacuum Cup (large)	*Kandy*	.50
1573—Metal Attachment for connecting the Rubber Cups to the Vacuum Handle	*Kelbie*	.20

De Vilbiss Atomizers

An important feature of these Physician's Atomizers is that they can be operated from a hand bulb, or from the compressed air supplied from the T. & P. Cabinets. They are made of all metal, and can be readily sterilized by boiling, or passing the spray point through a flame.

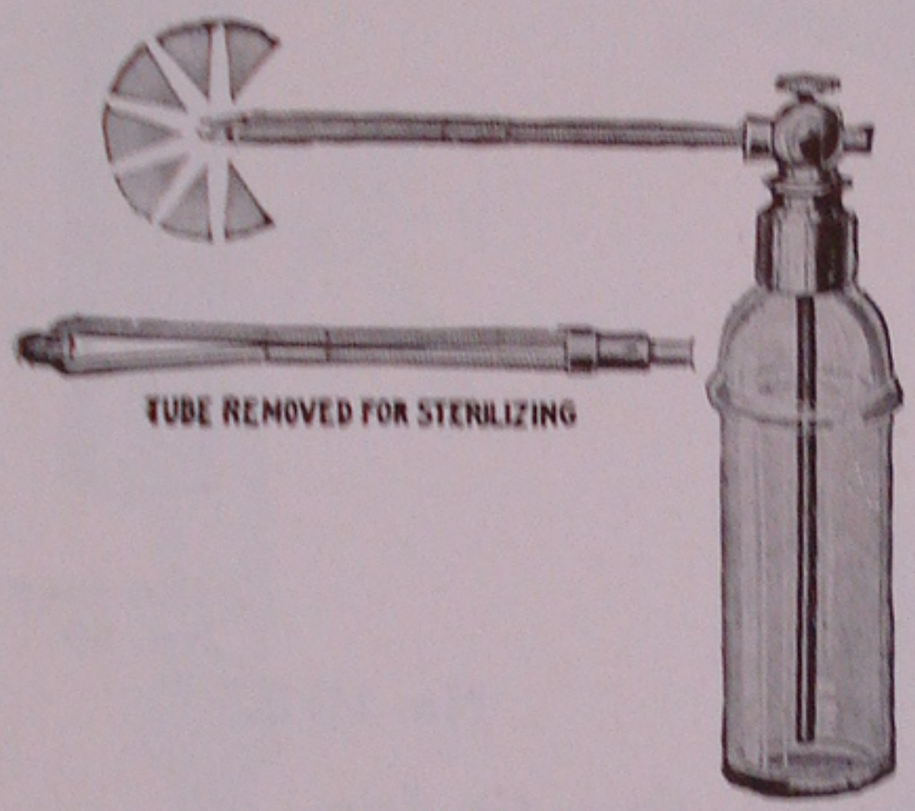
Nos. 52, 54, 56 and 50 are provided with an extra hard rubber tube for spraying corrosive solutions.



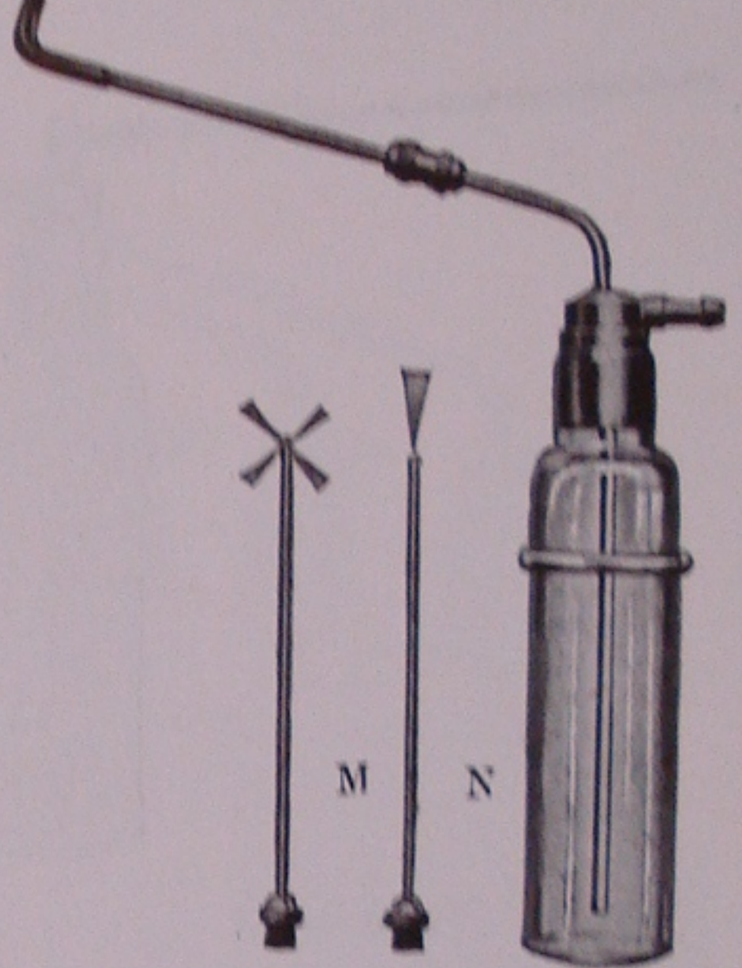
No. 1521 **No. 1523** **No. 1520** **No. 1522**

No.		Code	Price
1520	—Empty Bottles only	*Kali*	$0.30
1521-52	—Atomizers—sprays any liquid, oil or aqueous, in any direction desired	*Kalium*	1.30
1522-80	—Nebulizer—produces a vapor; for Oils only. The vapor can be weakened by turning the little table to a horizontal position, or strengthened by turning it to a perpendicular position	*Kamala*	1.30
1523-73	—Powder Blower—diffuses powder perfectly in any direction	*Kaolin*	1.30

De Vilbiss Atomizers-Continued



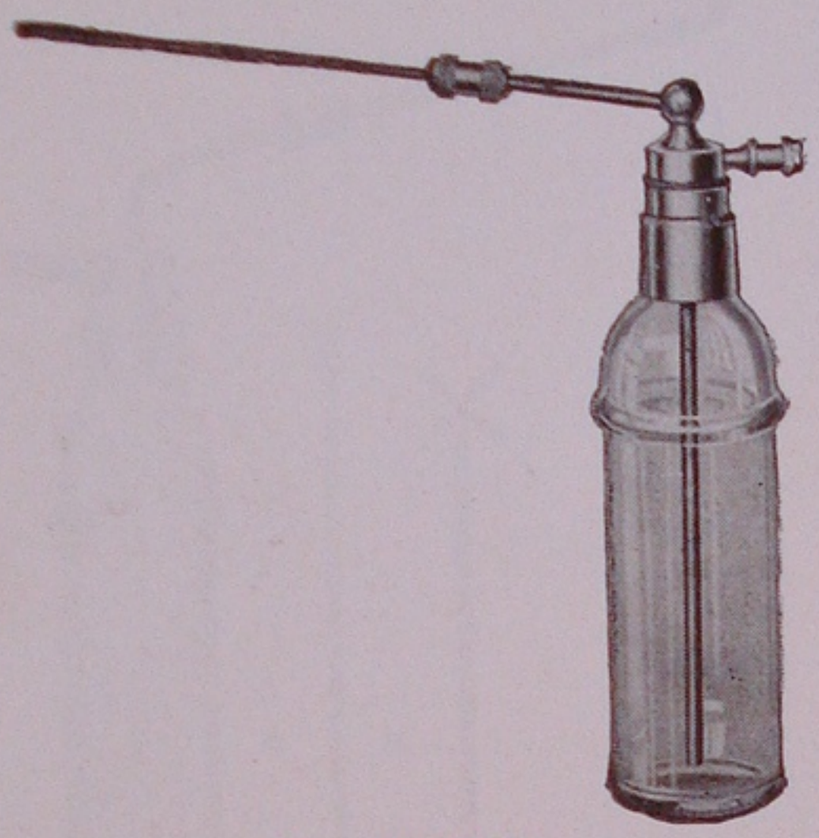
No. 1524



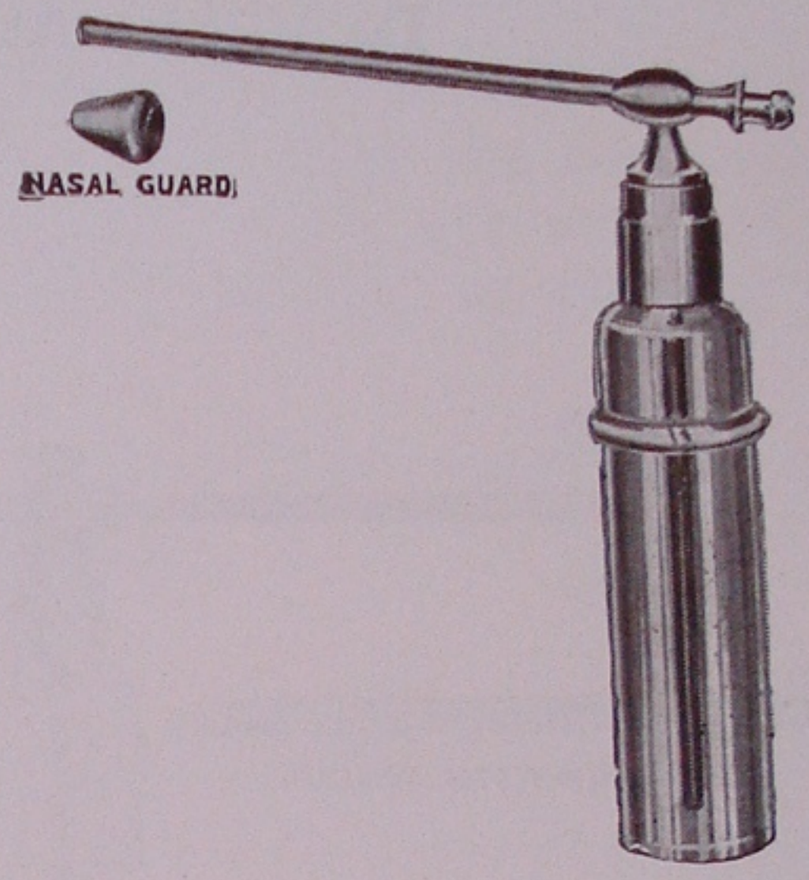
No. 1525

No.		Code	Price
1524-54	Atomizers—similar to No. 52, but with the additional advantage of removable top. As the spray tube can be readily removed, additional tubes may be used, eliminating the necessity of stopping to sterilize between treatments, and also making possible the having of an additional spray tube for each patient. Extra spray tubes, $1.00 each	*Kendal*	2.00
1525—56	Atomizers—for Oils and Acqueous solutions. As illustrated, the No. 56 is equipped with a Post Nasal tube for making applications direct to the vault of the pharynx and post nasal cavities. The four-way tip can be carried through the nares into the pharyngeal vault in the same manner as an Eustacheon catheter..	*Kassel*	1.50

De Vilbiss Atomizers-Continued



No. 1526

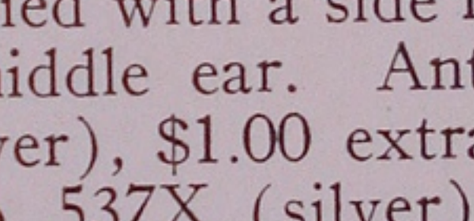


Atomizer
No. 50

No. 1527

1526-57—Syringe—supplied with a side flow tip for washing the middle ear. Antrum Tube No. 536X (silver), $1.00 extra. Frontal Sinus Tube No. 537X (silver), $1.00 extra. All tubes can be easily bent as desired ..... *Khalif* 1.25

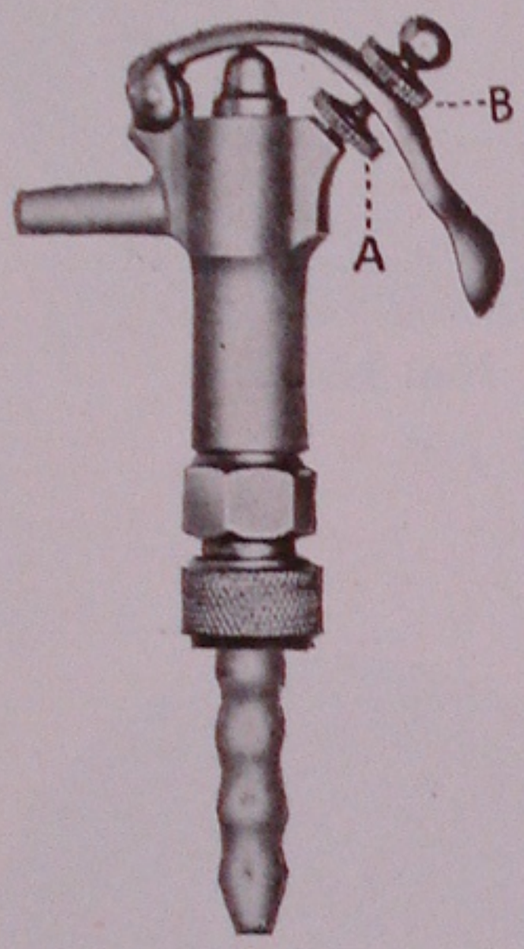
1527-50—Atomizer—sprays any liquid; oil or aqueous. This atomizer is of very simple construction, and is readily taken apart for cleaning ..... *Kilter* 1.25



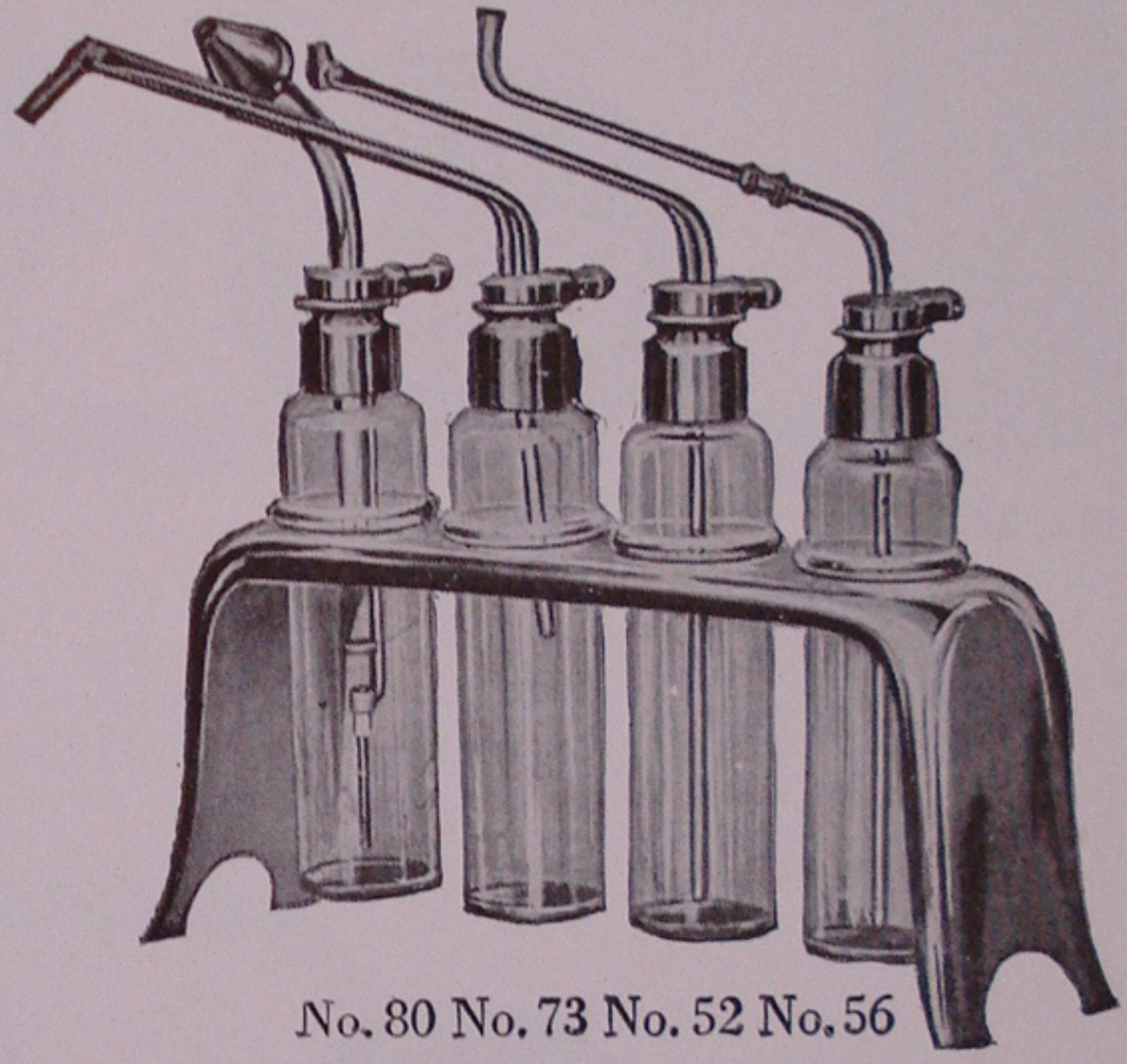
No. 1530

1530—Metal Connector, arranged to fit the tapered end of the pressure handle furnished with all Thompson & Plaster Cabinets, and to accommodate the regular DeVilbiss bottles..... *Karyon* .40

De Vilbiss Atomizers-Continued



No. 1528



No. 80 No. 73 No. 52 No. 56

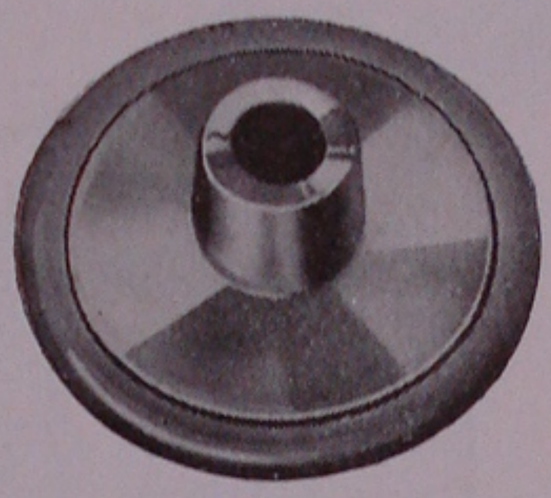
No. 1529

No.		Code	Price
1528-531	—Special Cut-Off; instantaneous in action; adjustable. No Rubber washers or valves to deteriorate or wear out, and will last indefinitely. Turn thumb nut "A" up to diminish spray, and down to increase. For a constant flow, turn thumb nut "B" down until the desired flow is obtained. Can be used to advantage in connection with Eye, Ear, Nose and Throat work, with any of our Pump outfits.....	*Kirtle*	2.00
1529-523	—Physician's Four Hole Bottle Rack, made of brass throughout, highly nickel plated.	*Knight*	1.25

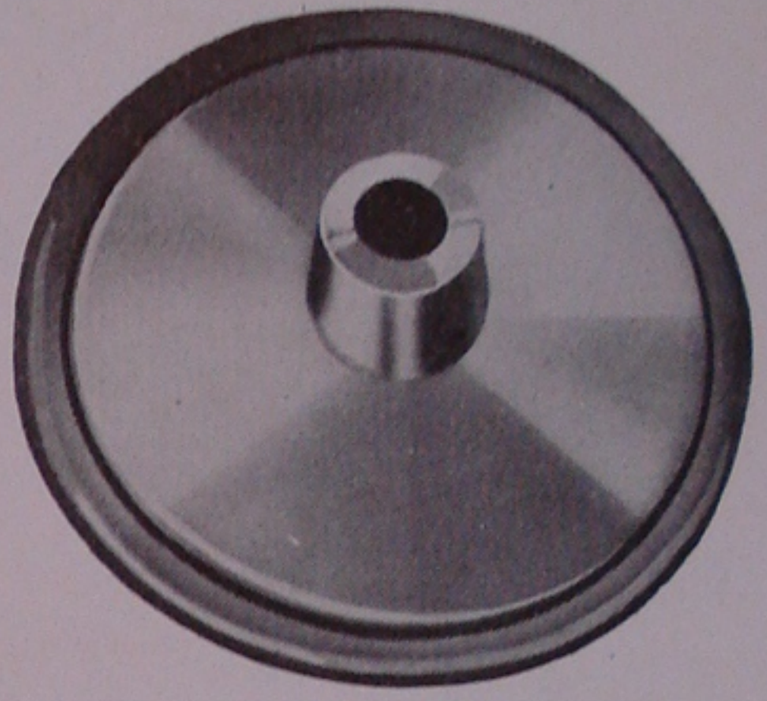
Pneumatic Vibratodes



No. 1550



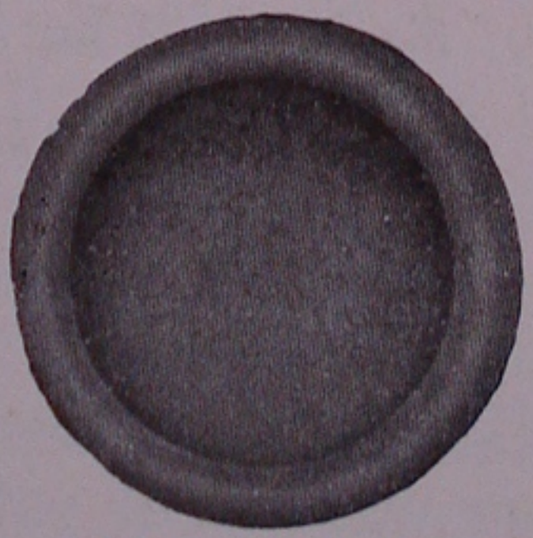
No. 1551



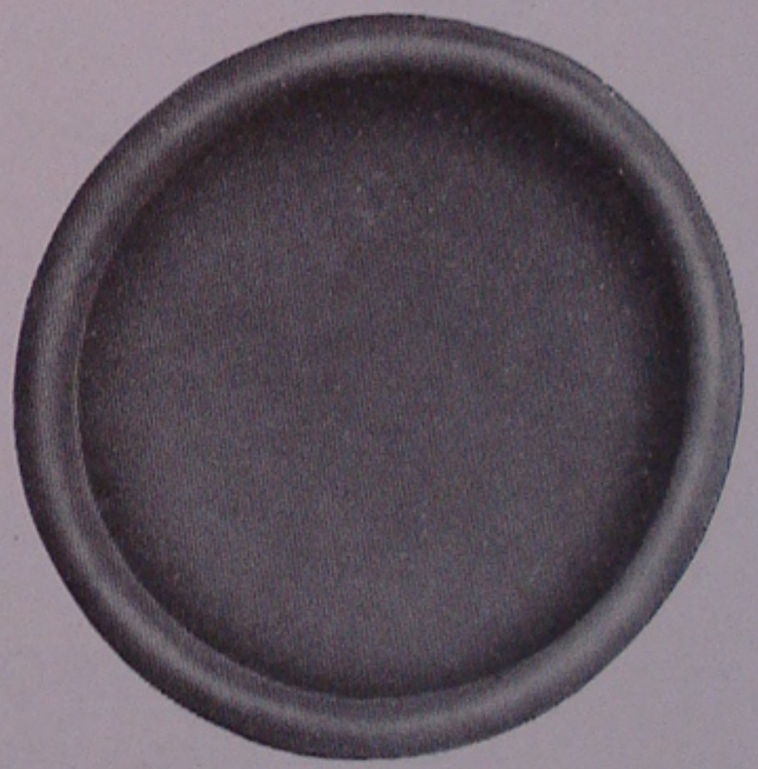
No. 1552



No. 1550 R



No. 1551 R



No. 1552 R

No.		Code	Price
1550	—Small size Vibratode, Rubber Holder.....	*Kation*	$0.25
1550R	—Small size Vibratode, Rubber Cap.....	*Kabul*	.10
1551	—Medium size Vibratode, Metal Holder....	*Kadesh*	.50
1551R	—Medium size Vibratode, Rubber Cap.....	*Kaffir*	.25
1552	—Large size Vibratode, Metal Holder.....	*Kago*	.60
1552R	—Large size Vibratode, Rubber Cap.....	*Kayak*	.25

Cavity Vibratodes

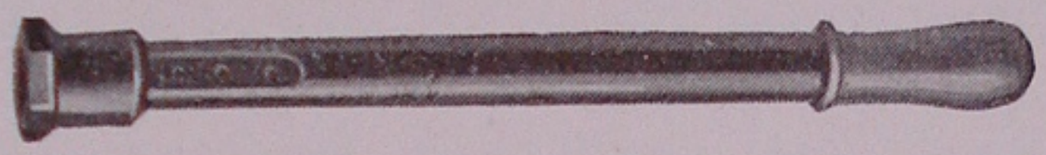


No. 1560



No. 1560 A

No.		Code	Price
1560	—Vaginal Vibratode, Hard Rubber	*Kane*	$0.50
1560A	—Vaginal Vibratode, Soft Rubber Cap	*Kaolin*	.20

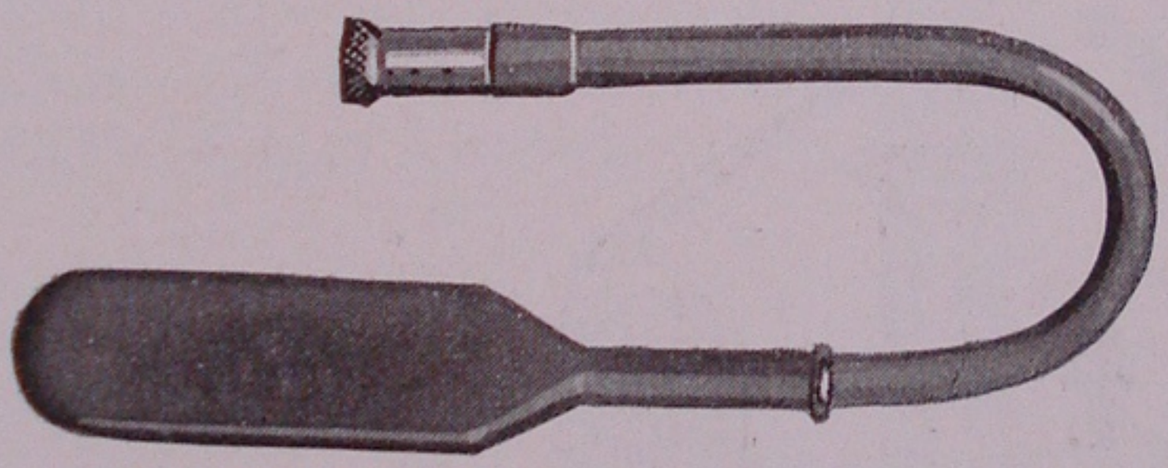


No. 1561



No. 1561 A

1561	—Rectal Vibratode, Hard Rubber Cap	*Karma*	.50
1561A	—Rectal Vibratode, Soft Rubber Cap	*Karoo*	.20

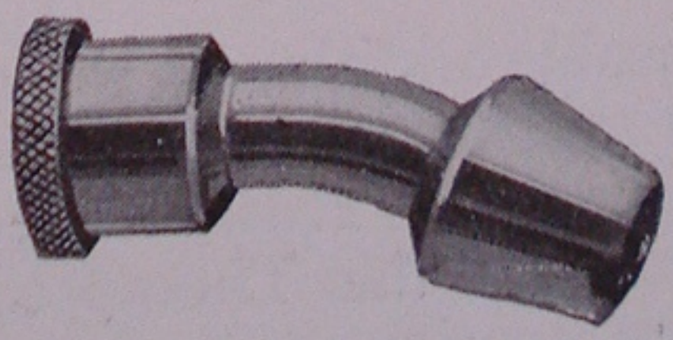


No. 1562



No. 1562 A

1562	—Flexible Rubber Colon Catheter, with Metal Attachment	*Kauri*	1.00
1562A	—Dilating Bag for No. 1562 Catheter	*Keany*	.50



No. 1575

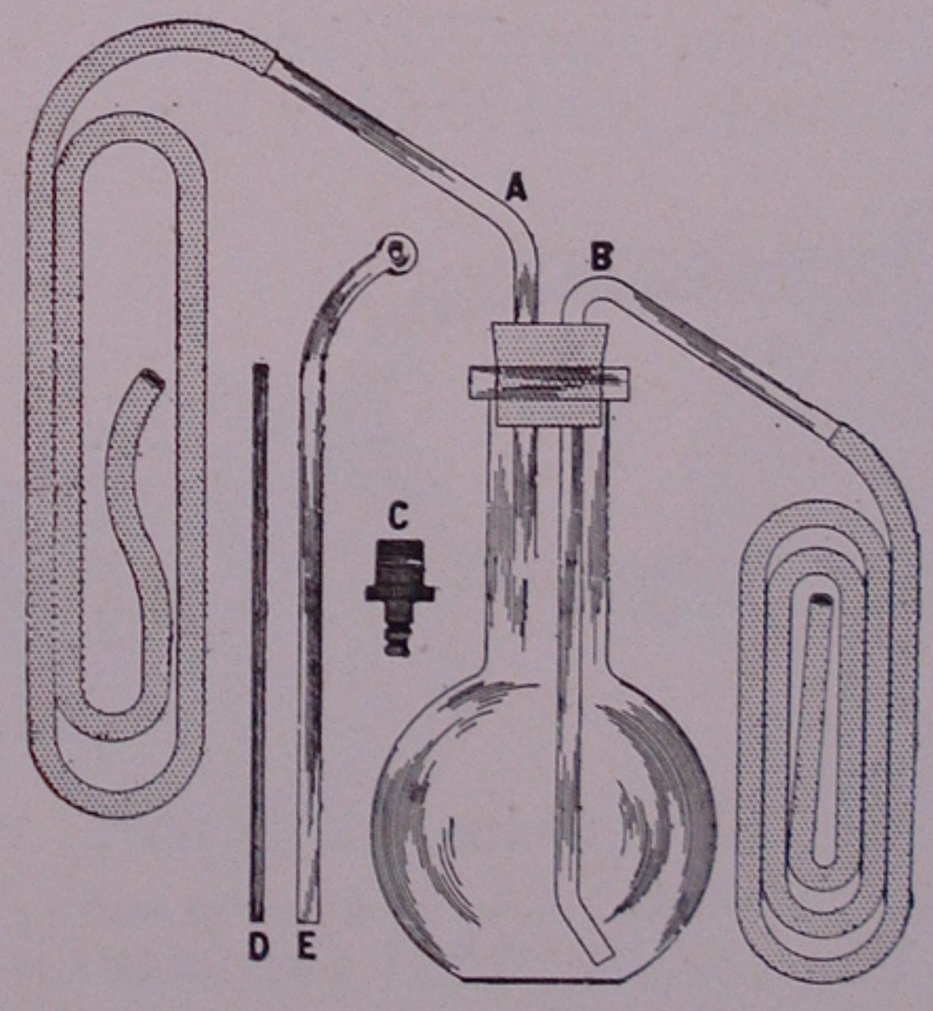
1575	—Eustacheon Tube Opener	*Kennel*	.35

Air Heater-Illustrated on page 6

For heating air to any temperature, from a mere sensation of warmth up to all that a patient can stand. Output is under perfect control, as the energy for operating is obtained from the Cautery Circuit, and any degree of heat may be maintained indefinitely. Should the Heating Unit, or Element, become damaged in any way from any cause, it is a simple matter to slip in another. Two Heating Units are supplied with each heater.

No.	Code	Price
1570—Heater—with extra unit	*Acoin*	$5.50
1571—Extra Heating Units	*Keck*	.75

Suction Bottle



No. 1577

An almost indispensable addition to the equipment of the Eye, Ear, Nose and Throat specialist, and in fact a valuable accessory for the general practitioner. This Bottle used in conjunction with the suction feature of the Thompson & Plaster Cabinets will provide a uniform suction, and prevents any material removed from entering, or interfering with the operation of the pump.

Suction Bottle-Continued

The Bottle is shipped complete as illustrated. New Catheters and Syphons can be furnished from stock; special or longer Catheters made to order only.

A Suction Bottle is exceedingly valuable in the evacuation of muco-purulent discharge from nasal sinuses. Also the treatment of all supurative cases is greatly simplified. Cases of Atrophic Rhinitis, Pan-Sinusitis, emptying the cavities of Peritonsillar Abscesses, and for many other treatments, the Bottle can be used to advantage. It will clean out any abscess cavity better than any other method, and cause less distress at the same time.

No.		Code	Price
1577	Suction Bottle, complete as illustrated	*Hepar*	$3.50
1532	Extra Bottle only	*Hatch*	.60
1533	Rubber Tubing, per foot	*Hauld*	.12
1534	Silver Catheters	*Haven*	1.00
1535	Glass Syphons	*Hawse*	.25

Pressure Tubing

No.		Code	Price
1517	Extra Pressure or Vacuum Tubing, woven cotton covered, any lengths, per foot	*Cyanic*	$0.12

Pressure Handle

Hard Rubber Handle, fitted with control valve, for use with Vibrator No. 1510.

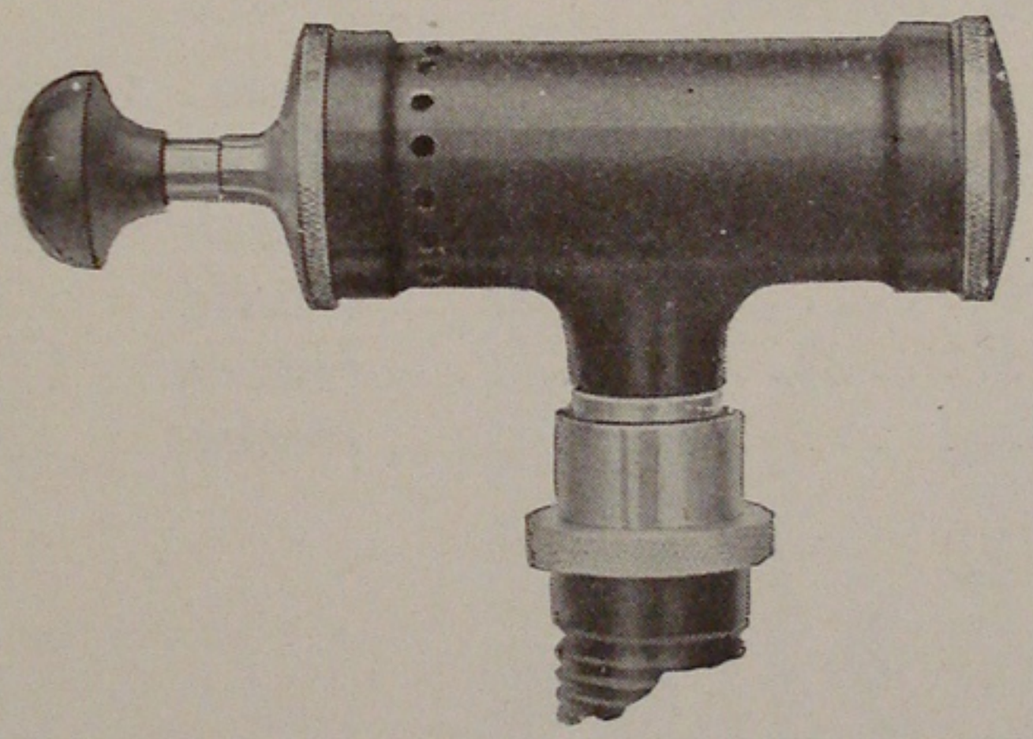
No.		Code	Price
1516	Pressure Handle with 6 foot Tubing	*Cyprus*	$3.00

Pneumatic Air Hammer Vibrator

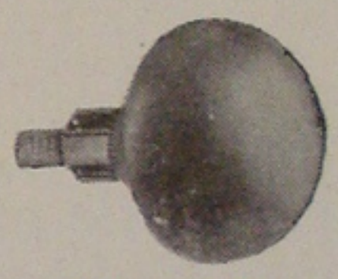
While the ordinary Rubber Capped Vibratodes used with our Cabinets, with the Compressed Air feature, are very satisfactory for general massage purposes, many operators prefer a heavier, more penetrating stroke.

Our No. 1510 Percussion Air Hammer Vibrator was designed and built to deliver anything from a mere thrill to a long, very heavy stroke that cannot be stopped. Press as hard as you wish, and the piston will still operate.

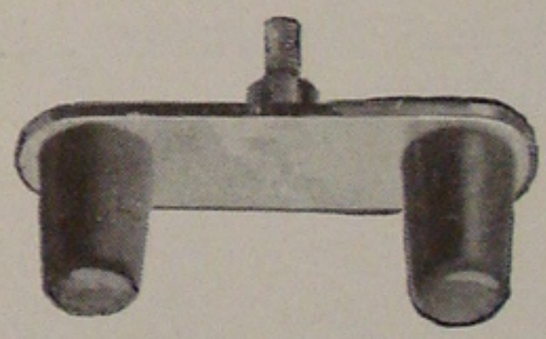
Finished in black enamel and nickel plate. Arranged to screw on end of pressure handle, or if desired will be furnished complete with a hard rubber handle and pressure hose to attach to any source of compressed air. Degree of vibration controlled by air valve in handle.



No. 1510



No. 1511



No. 1512



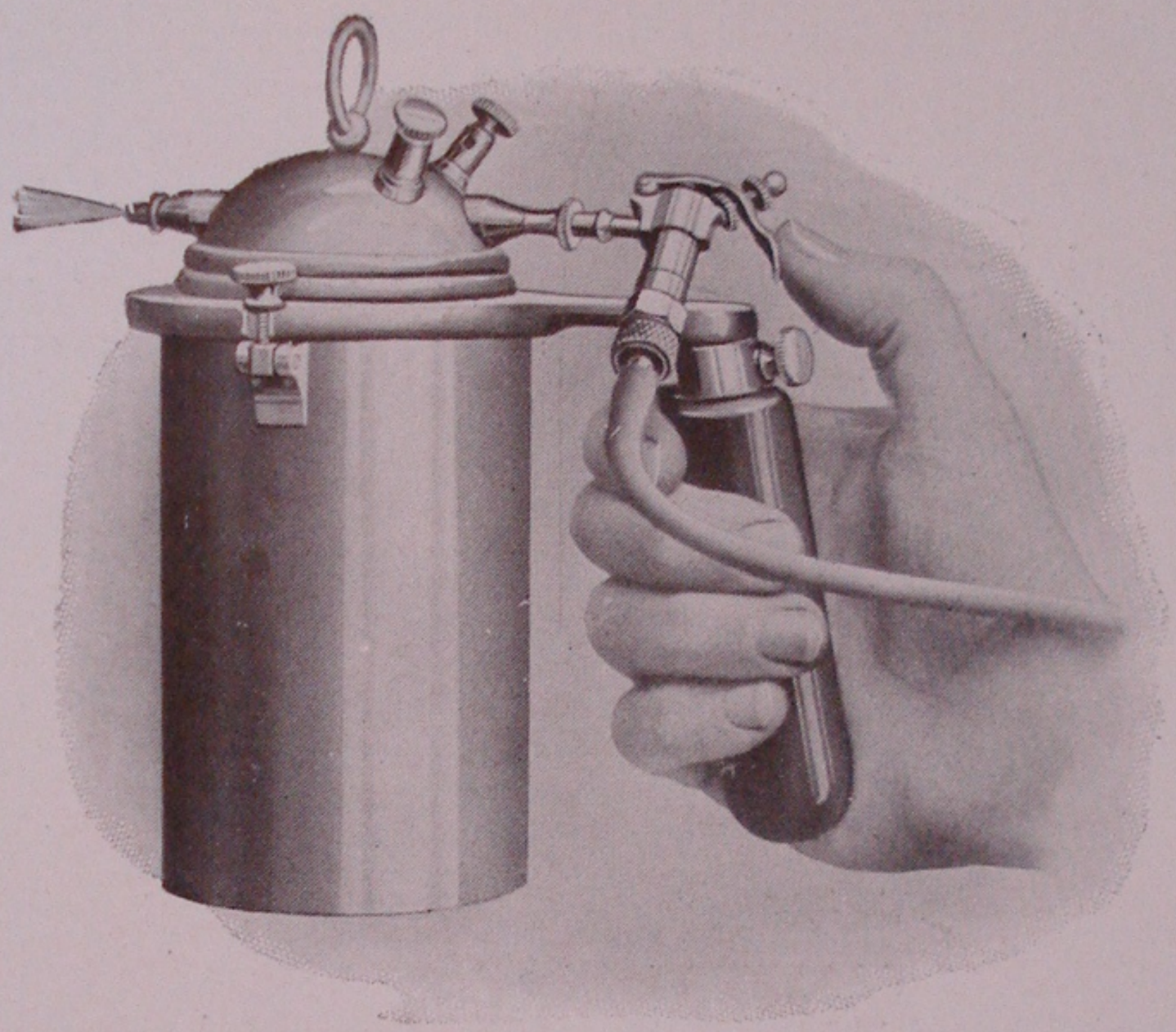
No. 1513



No. 1514

No.	Code	Price
1510—Air Hammer Vibrator	*Canker*	$5.50
1511—Ball Applicator for 1510	*Canon*	.60
1512—Spine Applicator for 1510	*Canula*	.60
1513—Curved Applicator for 1510	*Captul*	.60
1514—Large Body Applicator for 1510	*Caput*	.75

Wax Theromer - Electrically heated - Double Container



No. 1584

This is a specially designed and dependable apparatus for reducing Wax-like and Paraffine preparations to a liquid state by heating, and for spraying the liquid thus formed.

It applies, most effectively, these preparations as a dressing for burns and all inflamed surfaces, to relieve pain and to form a protective covering which encourages the rapid growth of new tissue.

It is indispensable in the hospital. It is also of inestimable value to the physician for treating cases outside of the hospital, and for industrial plants where the danger of burning is ever present.

The Theromer is all metal, and has two containers; an inner one for holding the preparation, and an outer one forming a water jacket around the preparation. In the center of the inner section is mounted the Electrical Heating Unit, arranged that the wax passes through a small tube surrounded with the heating element; heating the wax at the proper point, just before it leaves the nozzle, and eliminating all danger of clogging at that latter point.

Wax Theromer No. 1584-Continued

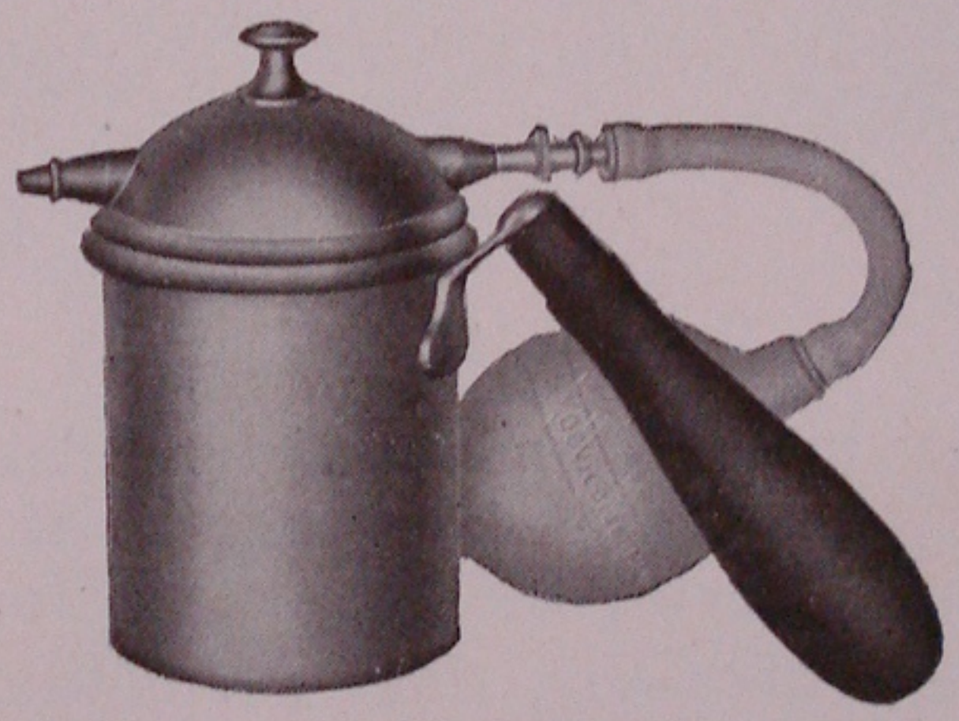
This Heating Element is arranged to connect to the harmless low voltage Cautery Circuit on any of our Cabinets. The degree of heat is regulated in the same manner as the cautery knife.

No.		Code	Price
1584	Electrically Heated DeVilbiss Wax Spraying Theromer	*Kolon*	$16.50

Paraffine Wax for use in the Nos. 1584 and 1588 Theromers, in cakes of one-half pound each.

No.		Code	
1586	Paraffine Wax Cake	*Kobalt*	Per cake, $0.75

Wax Theromer - Single Container



No. 1588

The Wax Theromer Jr. was brought out to meet a demand for a smaller, lighter container than our No. 1584. This instrument is thoroughly practical in every detail, and is very simple to operate.

It is constructed same as the No. 1584, except that it has no outer hot water jacket, and must be heated by immersion in some other tray or pan. Has the same electrical heating unit device, and is fully guaranteed to give satisfactory service. Designed especially for the general practitioner.

No.		Code	Price
1588	Wax Spraying Theromer Jr	*Kaiak*	$8.50

HEMORRHOID TREATMENT

BY

GALVANISM

Ogden

HEMORRHOID TREATMENT

By

GALVANISM

by

W. E. Ogden, M.D.

Clinician - Lecturer

Introduction

THERE are many thousands of rectal sufferers, who, for fear of the old method of treatment for diseases of the rectum, will continue to suffer unless relief is given them in some other manner than by the clamp, cautery, or ligature, therefor;

The following pages of this book have been made plain and simple, devoid of all technicalities which might confuse the physician who desires to obtain a more comprehensive knowledge of this special line of work.

This book is the result of twenty years' study of the practice of Proctology, along the more conservative lines, with the barbaric and painful methods of the past eliminated. We have seen the patient in the hospital suffering the most severe and excruciating pains from hemorrhoidal operations. The methods given in this book will prove to you conclusively how unnecessary it was, and is. The dreaded general anesthetic is also eliminated in the dissolvent method.

What is said here of the treatment of Hemorrhoids is true to a great extent in the treatment of all other diseases of the rectum.

There have been many attempts made to find some injection method which would dissolve or absorb the tumor, but all of them have given unsatisfactory results to the physician and patient. Physicians, though many are suffering with Hemorrhoids, will be the last to submit to an operation for them, though often advising patients to do so.

The textbooks on proctology are limited as compared to those written on the treatment and surgical methods employed by other specialists of the medical profession. When we consider that eighty percent of all people have some form of rectal trouble, it seems as though there should be greater advancement in this field of work.

We want to make one word distinct and emphatic; that word is DIAGNOSIS. There is no class of diseases where it is more essential that we should know just what the trouble is, than in the treatment of rectal diseases. The patient always has his own diagnosis made when he consults you. It is always "Piles." Too often the physician in general practice will take the patient's word, without an examination, and give him some salve or medicine, not knowing what the trouble is. The proctologist does not usually get rectal cases until others have failed to give the necessary relief.

We are surprised that more attention was not given to the method described by Dr. Baker in a paper which he read before the Milwaukee Medical Society in 1892: "Treatment of Hemor-

rhoids by Electricity." On account of faults in its mode of application it was not used. We do not hear again of the treatment until a Chicago physician in 1899 made an attempt to use the method but failed. Three or four years later it was used with great success, but the methods were never published or given to the profession. Since that time it has been used in the treatment of many thousands of patients with statements from them that the method was painless. From that time until very recent years it has been kept as a secret method.

We emphasize that it is absolutely necessary that you know the anatomy and physiology of the rectum and its surrounding structures. Know normal conditions; it is the object of this book to show you the pathological conditions and how to treat them, and, in the majority of cases, to treat them in your office.

With careful study, and attention to details which will be given you, you can become a good operator, and effect the relief of many who suffer but cannot afford a long, expensive trip and the charges of a noted rectal specialist. You can do it as well as he with careful study and practice.

The field is great and proctologists are few compared to the specialists in other branches of medicine.

PREPARATION FOR THE WORK

First, know the normal, and then you will be able to know the abnormal and pathological conditions. You must be one who is willing to be sure in his diagnosis—no guess work!

The patient, as we said before, will probably have his own diagnosis made of "Piles," and should you find on examination that he has fissure and not piles he will go away from your office only half convinced of your diagnosis. It is up to you to find out just what his trouble is. Be sure you are right before you commence treatment.

You should enjoy this line of work because you will be able to relieve so much suffering and do it without taking your patient to the hospital or detaining him from his work. There is no class of patients as appreciative of relief as rectal sufferers. When you relieve them they begin, long before you have finished their cases, to hunt up another patient among their friends and acquaintances.

At first thought it might seem to be unpleasant work on account of the part of the body worked upon. We have seen the white coated dentist and have not considered the unpleasant task often before him, yet he must work on the teeth with unpleasant breath in his face from the mouth of someone who has decayed teeth or

whose gums are infected with pyorrhea. The proctologist, with a piece of cotton, antiseptic soap and water, can remove all the unpleasant conditions he may have to deal with.

METHOD OF MAKING EXAMINATIONS

Find out—

1. The location and nature of the pain, if any occurs.
2. Whether it is burning or smarting.
3. Whether it occurs during, or after bowel movement.
4. Whether there is a discharge from the bowel, and, if so, its nature.
5. Whether anything protrudes at or after stool.
6. Whether or not there is bleeding.

After these questions have been answered you have accomplished two things. You know or should know what to look for in your physical examination. You have become acquainted with your patient.

It is necessary for the patient to lie down on the left side with the knees drawn up, the right hand holding up the cheek of the buttocks, the rectum being then exposed to view.

Examine the surface. Notice whether swelling or any protruding or foreign bodies, redness or inflammation are present. Examine the tissues surrounding the rectum for fistula openings.

Next, gently insert the index finger of the right hand, well anointed with vaseline, into the rectal canal, examining for piles, fissures or other pathological conditions.

If you deem it necessary to obtain a view of any part, insert either a proctoscope or speculum which must be well anointed with vaseline. (In making examination with a long periscope it is necessary to place the patient in the knee-chest position). If fistula is present, its course can be noted with a flexible probe.

It is not good advice to give electrical or operative treatment the first day the patient calls unless they are suffering from some acute disease, such as fissure, an abscess, or strangulated hemorrhoids. In these cases it is your duty to act at once, otherwise use one of the ointments, either Saratoga or Mecca.

If the patient tells you his hemorrhoids protrude when he goes to the stool, it is well, in making your examination, to give him an enema of warm water. Send him to the toilet with instructions to strain them out, if he can, and let them remain out for your examination.

It is good practice in most cases to let the patients replace the hemorrhoids themselves, as they are accustomed to do so. If it

causes them any pain, they will not attribute it to your work. They will bear the pain much better if they are causing it themselves.

There are cases where the patient is unable to replace the hemorrhoids. In such cases first anoint the first finger well with vaseline and gently insert it in the rectal canal, before you attempt to replace. Insert the hemorrhoids which appear to be highest up. Experience will teach you in a little time to select the hemorrhoid which should be replaced first. Do not attempt to force them all back at the same time. Never permit a patient to leave your office with hemorrhoids protruding.

OFFICE EQUIPMENT AND INSTRUMENTS NECESSARY

It will be sufficient to mention only the office equipment and instruments that are essential to the protologist. He will add to these as the occasion requires, and for his own convenience. Every operator will eventually choose his own instruments. The following list is only suggested to help you get started.

The operating table should be one which can be lowered or raised.

A machine generating a perfectly smooth galvanic current is absolutely necessary. It is inadvisable to undertake the treatment of hemorrhoids by galvanism unless you are properly equipped. Special attention should be given to the nature of the current furnished. There should be a continuous undirectional flow at delicate settings as well as at the heavier settings, and you should assure yourself that the generator will be able to deliver smooth, absolutely uninterrupted flow before you purchase. The careful decision in purchasing, and the resulting appreciation by patients will result to material advantage.

A large electric pad, about eight inches in diameter.

Two connecting cords, each about six feet in length.

Brinkerhoff speculum—These are made in three sizes: Large, medium and small. You will need about three medium, one large and one small. In selecting a Brinkerhoff speculum great care should be exercised. Do not accept one on which the slide does not work easily or the edges are imperfectly milled. A poor speculum will cost you many patients as it cannot be used without causing pain.

LIST OF INSTRUMENTS

Two pair of curved scissors.
One pair of small scissors, straight.
One small knife.

One pair of hemostats.

Two pair of dressing forceps—short and long.

Buttonhook probe.

Silver probe (flexible)

Two hypodermic syringes, glass; one, five cc.; one with extension about two inches in length.

Bullet crushing forcep.

Currette, small (one used in ear on sinus work.)

Hard rubber syringe with long nozzle for irrigation, two ounces in size.

Two powder blowers with long nozzles, three or four inches in length.

Some kind of a sterilizer.

Two-quart irrigating can with rubber tube and rectal tip.

Box of wood applicators, six inches in length.

Two spools of silk ligature, one number seven and one number eight.

One tube of umbilical tape.

Sterilized gauze.

Bandages (two and one-half inches).

Specially constructed electrodes (see description how to make under treatment for hemorrhoids).

LIST OF DRUGS USED

Saratoga Ointment: Put up in two ounce collapsible tubes with pile pipe and key.

Mecca Ointment: Put up same as Saratoga.

Mineral Oxide.

Vitrogen Dressing Powders.

These preparations are proprietary, but are essential in your work. The manufacturer will furnish you with the formulas. The following drugs can be obtained from your local druggist.

Peroxide Hydrogen.

Carbolic Acid.

Stick of Silver Nitrate.

Boracic Acid.

Novocaine—one-half of one percent.

Two percent solution novocaine.
Grain Alcohol.
Normal Salt Solution.
Some good cathartic pill or tablet always kept on hand.
Sterile Water.
White Vaseline.

HEMORRHOIDS—CLASSIFIED

Hemorrhoids are the most common of human ills. Believe that if a careful examination was made of the first one hundred persons you meet, you would be able to find that seventy-five of them were afflicted with hemorrhoids in some form, though many of them were not aware that they had any form of rectal disease.

We shall divide hemorrhoids into four classes: Protruding, Internal, Mixed and Strangulated.

Hemorrhoids are small pouches or blood tumors, as a result of the breaking down of the capillary circulation on the internal wall of the anus. Their appearance presents a bright red color unless they are of the mixed variety, and then there is a portion which is covered with mucous membrane. This is easily distinguished as you will see the pale color of the mucous membrane and the bright red color of submucous or hemorrhoid tissue.

You will observe another class, which are very dark in color. This is due to the congestion of the blood in the walls of the hemorrhois. Hemorrhoids, when not under strain as in defecation and not protruding, are loose sacs or folds of membrane felt on the rectal wall, but when filled with blood from straining or protruding, they become distended bodies of various sizes, shapes, and numbers.

PROTRUDING HEMORROIDS

Protruding hemorrhoids are very easily diagnosed. The patient will tell you that on going to stool there is something which protrudes from the rectum. An injection of warm water may be given and the patient straining them out, your diagnosis is easily made.

THE SYMPTOMS OF PROTRUDING HEMORROIDS

They may be very painful on defecation or there may be only slight discomfiture. This will depend upon whether the external sphincter muscle is tight or relaxed. If contracted it will cause pinching or contraction on the pile tumors, causing burning and smarting pain. There may be bleeding in any form of hemorrhoids.

Protruding hemorrhoids produce an interference with the bowel movement. The patient will complain that it takes a longer time to have an evacuation, and it does not matter how long he remains on the toilet, he has the sensation that he still wants to strain something out. This is due to the protruding hemorrhoids or to internal hemorrhoids obstructing the passage. The bowel movement, if formed, in small or ribbon shaped.

Hemorrhoids may cause many constitutional symptoms, nervousness, backache, legache, and many others. They may cause anemic conditions from loss of blood, as the bleeding is sometimes profuse. In our opinion, there is no classification, as some writers claim, in reference to bleeding hemorrhoids. Any hemorrhoids may bleed today and not tomorrow; whenever the wall breaks down sufficiently to expose a capillary, bleeding must follow.

Be sure to differentiate external hemorrhoids from prolapsus of the rectum, hypertrophied rim, polypus, thromboid and cancer nodules.

It is of greatest importance to notice the line of demarcation, where the hemorrhoid proper begins and the line of mucous membrane of the rectum. The rim is usually thickened in protruding hemorrhoids from over-stimulation or excessive blood supply, which the hemorrhoids have caused. This condition, however, will subside when hemorrhoids have been removed.

Hemorrhoidal tissue (submucous) has no sensation, as it is not supplied with nerves, the pain being caused from the distention of the sac, causing a tension of the mucous walls of the rectum. You can thrust the hypodermic needle into the hemorrhoidal tissue and inject it, and there is no sensation of pain, and when treatment by the improved galvanic method is given properly, at most they will complain only of a slight feeling of warmth; but be sure you are in the hemorrhoidal structure.

INTERNAL HEMORRHOIDS

They are pouches or blood tumors on the internal wall between the internal and external sphincter muscle, but which do not protrude from the rectum. In structure and formation they are the same as protruding hemorrhoids. The most marked symptoms which the patient will complain of is a feeling of fullness in the rectum at the time of stool. There may be a severe pain, burning and smarting. They may bleed, though the bleeding is not so profuse as in external hemorrhoids.

Internal hemorrhoids today may be protruding hemorrhoids tomorrow. Their treatment should not be neglected. Some of the

worst cases of strangulated hemorrhoids result from internal hemorrhoids. They may become enlarged from straining, they protrude, and a tight sphincter contracts down on them. The patient is unable to replace them. The differential diagnosis should be made from polypus, papilla, internal abscess and cancer nodules.

MIXED HEMORRHOIDS

Mixed hemorrhoids are nearly always those of the protruding variety. You will notice the tumor protruding from the rectum, part of it of the pale flesh or mucous color, and part of a bright red. The reason we term it a mixed hemorrhoid is because it is partly covered with mucous membrane. They are usually found in patients who have had hemorrhoids for a number of years. The symptoms and differential diagnosis are the same as in protruding hemorrhoids.

For ages past man has suffered with hemorrhoids. It is an ancient disease and one which has always presented a quandary to the medical profession.

Cooke tells us that: "The early history of this disease constitutes one of the most interesting chapters of medical literature. Introduced to us under the name of 'emerods' by Moses and the prophet Samuel away back in the remoteness of sacred antiquity, its position among human ailments is both conspicuous and unique. The first recorded reference to it is found in the fifth book of the Old Testament, where it appears among the long list of curses for disobedience with which the children of Israel were threatened: 'The Lord will smite thee with the itch, whereof thou canst not be healed.' "* Three centuries later the disease appears for the first time as an actual condition under the strange guise of a plague or curse visited upon the Philistines for having taken the ark of the covenant. In order to rid themselves of their affliction, we are told, the Philistines were instructed by their priests and diviners to return the ark to the children of Israel, sending with it as a trespass offering golden images of their "emorods." The student of the subject will find entertainment, if not instruction, in reading I Samuel, v and vi.

"The subsequent seven or eight centuries are a blank as far as concerns the history of the disease, and not until the advent of Hippocrates do we find it assuming a definite place in nosology. From this time on practically every medical author among the ancients wrote upon the subject, and, following the teachings of their illustrious master, the same fantastic views and grotesque theories, gravely stated, mark the writings of all.

*Deuteronomy, xxviii, 27.

"For many centuries the very nature of the disease was wholly misunderstood. The Father of Medicine himself regarded hemorrhoids as 'a defluxion of pituitous matter to the veins of the anus' whereby was evacuated the black bile or melancholic humor, thus assigning to them an important office in the regulation of the vital functions. Most of the ancient writers subscribe to this view. And even the nineteenth century, with all its boasted enlightenment, did not fail to produce advocates of vagaries almost as absurd. Only a little more than seven decades ago the celebrated French writer, M. Trousseau, taught that the bleeding from hemorrhoids always served a salutary purpose in the economy, and recommended that suppositories or tartar emetic or cupping glasses be employed to reproduce it when 'suppressed.' "**

STRANGULATED HEMORRHOIDS

Strangulated hemorrhoids may have, and usually do have, a sudden onset. The patient may not give any history of protrusion from rectum at the time of stool. On going to stool, at this time, he may be constipated, or he may have been exposed to cold and on straining he will suffer from smarting and burning sensations. He is conscious that he has one or more pile tumors protruding from rectum. He does not attempt to replace them, thinking that they will replace themselves, but the sphincter has contracted, preventing the return blood flow. The blood congeals in the tumor, pain increases until it becomes almost unbearable. The tumor is dark in color and hard and stony feeling to the examining finger.

Differential diagnosis must be made between strangulated hemorrhoid and thromboid.

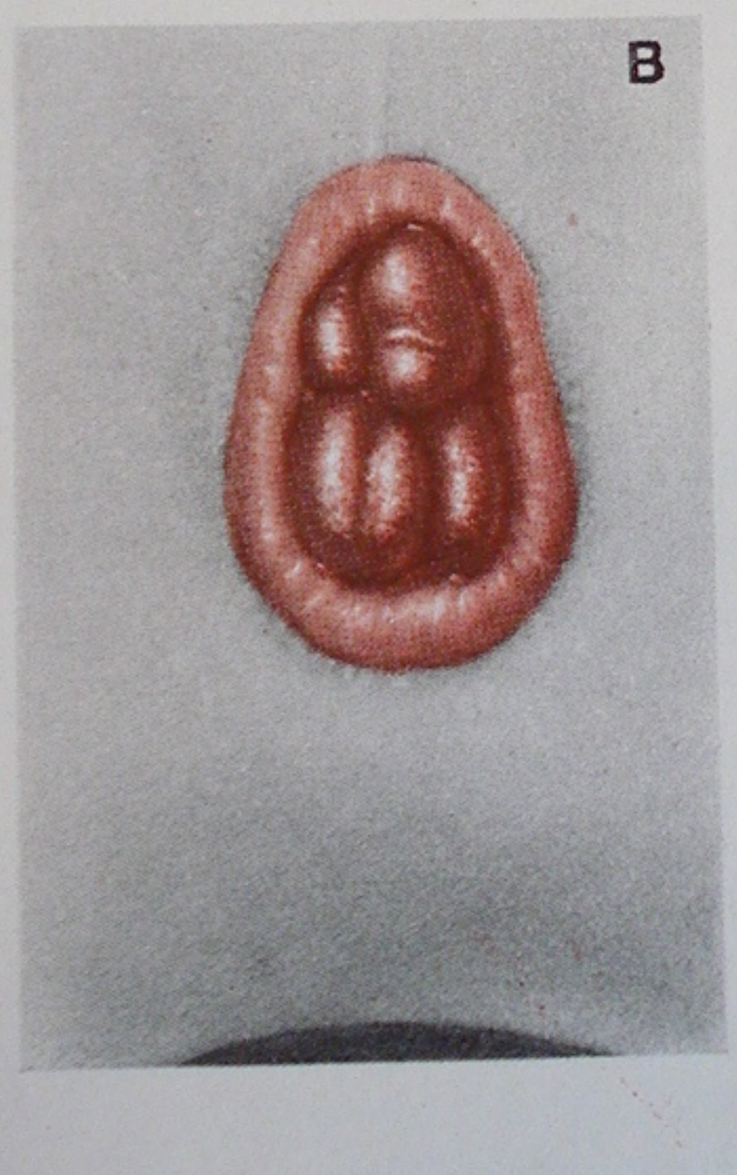
TREATMENT OF HEMORRHOIDS BY AN IMPROVED NONSURGICAL METHOD

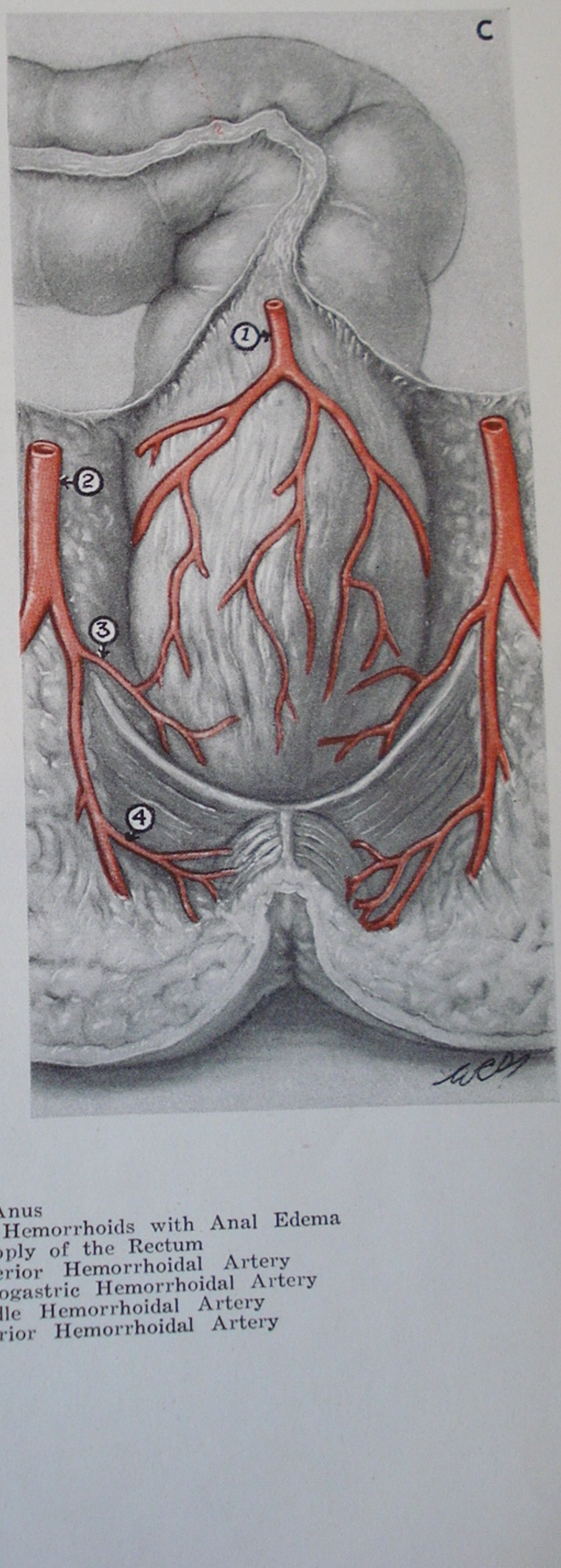
We are glad to be able to present to you a method in its fullest detail, which is devoid of the pain, danger and the dread of the general anesthesia which accompanied the old methods of treatment, and with far less possibility of their returning. A careful comparison of the history of patients who have previously been operated upon by some of the best surgeons in the country, have shown that the hemorrhoids have returned in about two years.

We use in this treatment the Galvanic current. We are aware that the Galvanic current with the electric needle or electrode has been used by a number of physicians with the report that poor results have been obtained. It is not the method which is at fault but the mode of application and the lack of close attention to details.

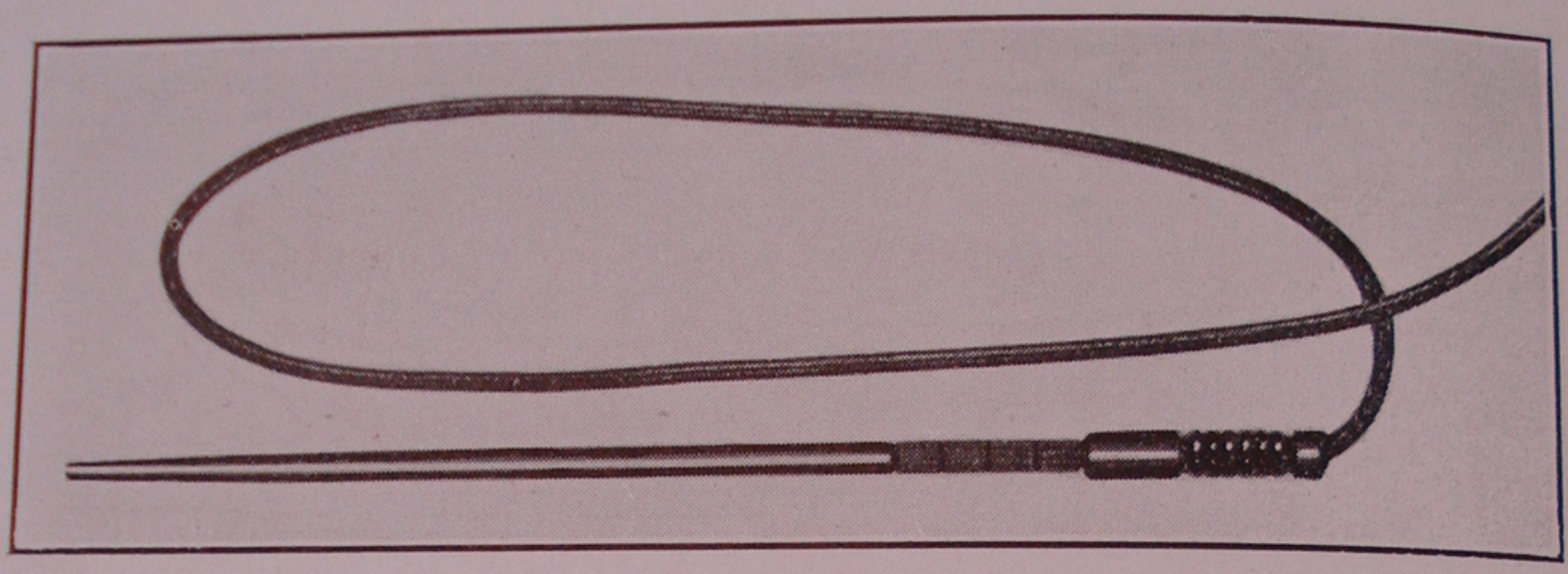
**Wm. Bodenhamer: "A Treatise on the Hemorrhoidal Disease" (Wm. Good & Co., 1884), pp. 136 and 137. This monumental work will well repay a careful reading.



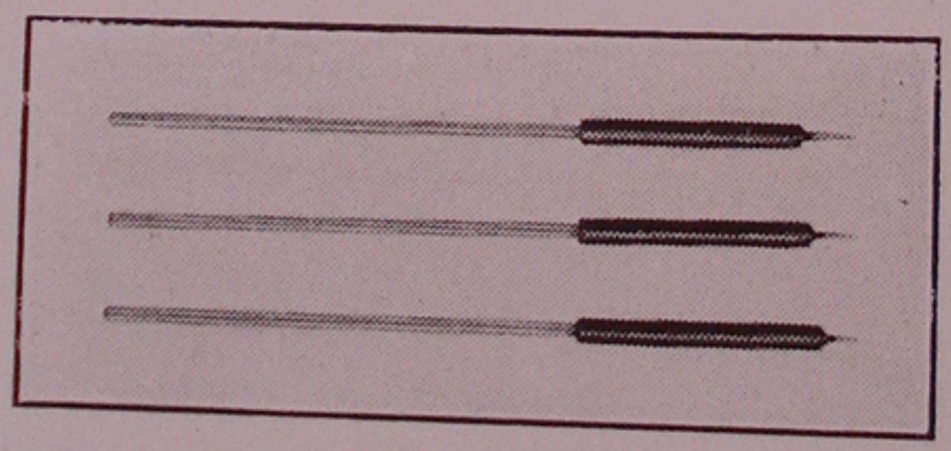




A—Normal Anus
B—External Hemorrhoids with Anal Edema
C—Blood Supply of the Rectum
(1) Superior Hemorrhoidal Artery
(2) Hypogastric Hemorrhoidal Artery
(3) Middle Hemorrhoidal Artery
(4) Inferior Hemorrhoidal Artery



No. 742 Ogden Galvanic Needle Holder, with cord (less needles)



No. 2606 Ogden Bakelite Insulated Hemorrhoid Needle..... 1/8″ tip
No. 2607 Ogden Bakelite Insulated Hemorrhoid Needle.....3/16″ tip
No. 2608 Ogden Bakelite Insulated Hemorrhoid Needle..... 1/4″ tip

If the following method is followed out in detail, failure is impossible in the majority of cases.

ELECTRODE

The active electrode is the most important of the instruments used in treating hemorrhoids. It must be carefully constructed with two objects in view. The first of these is the sure delivery of the current to the interior of the hemorrhoid; and second, the prevention of the escape of the electrically generated hydrogen gas from the interior of the hemorrhoid. Undoubtedly the lack of an electrode which would perform these two functions was the reason for the failure on the part of early galvanic current experimentors to successfully use that current for the treatment of hemorrhoids.

Motivated partially by these difficulties and partially by the desire for a more practical instrument we recently devised an electrode which is constructed along the necessary lines and need only be sterilized after each treatment to be ready for the next. (See figure).

The entire steel needle is of one piece ground down from a rigid shank and is polished to a hardened smoothness.

The shank is then insulated by being cast into bakelite to a thickness of wall of 1/32 in. to the needle end, where the insulation first quickly tapers off, forming a surface to block off hydrogen gas; after which the bakelite insulation delicately tapers off to a feather edge at the polished needle surface. This latter bakelite surface prevents electrical contact with the hemorrhoid at point of insertion.

Since the electrode must under no circumstances pass through the hemorrhoid and pierce the opposite wall, these electrodes are made in three lengths for large, medium or small blood tumors.

THE GALVANIC NEEDLE HOLDER

The requisites for a practical holder are convenience in handling, small diameter and a chucking device to hold the needle firmly during operation (see illustration). We recommend handle No. 742* which provides for firm clamping of the needle by means of a slight turn of the upper segment. The light flexible connecting cord is fastened securely in the handle. Handle is constructed of hard rubber, and is small in diameter. This precludes the possibility of interference with visibility when the Brinkerhoff speculum is used.

PROTRUDING HEMORRHOIDS

These should always be treated after patient has strained them out. It may be necessary in severe cases where tumors are large

*Fischer Accessory Catalog.

and you do not desire to treat all at the first time, to replace the ones you have decided not to treat at this sitting.

Inject hemorrhoid to be treated with one-half of one percent novocaine. Inject tumor until it stands out distinct and full.

A large indifferent electrode of the wet pad type is placed on the abdomen or under but and allow pole to set and held in place with bandage or belt. This pad is connected to the positive pole on the galvanic generator. The needle in the insulated handle is connected to the negative pole on the machine. The needle is thrust into the hemorrhoid until the glass bead rests firmly upon the exterior wall. This is necessary in order that the current shall be delivered inside the hemorrhoid. The negative current coming in contact with the water in the blood and the injected fluid will liberate hydrogen gas. Care must be taken not to press electrode so as to dent in the wall of the hemorrhoid. Be sure to keep the point of electrode away from the wall of the rectum. This can easily be accomplished if you will notice the direction of the direction of the rectal canal.

Now slowly turn on your current by moving the handle of the rheostat from left to right, watching the milliampere meter until it has registered from seven to fifteen milliamperes, according to the susceptibility of your patient. Some patients are very susceptible to electricity, while others are not. The current should be continued for about ten minutes, when you will notice a slight discoloration in the hemorrhoidal tissue. At first you will see white bubbles through the walls. Then they become darkened in color. After ten minutes' treatment, slowly shut off the current by moving rheostat from right to left to reduce current flow. When current is completely shut off withdraw the electrode and make another puncture about one-fourth inch from where treatment was given before, and repeat the same as before.

The number of punctures necessary to make in each hemorrhoid will depend upon their size. After first puncture is made, it will not be necessary to continue the current for ten minutes, as the body of hemorrhoid is filled with hydrogen gas, and the dark color will appear much sooner than it required for first treatment.

When you have completed your treatment of the hemorrhoid it should be very dark in color or nearly black. Treat each separate hemorrhoid in the manner described. You will have to use your judgment as to the number treated at one time. It is not a good plan to keep the patient on the table for more than forty-five minutes at one time.

Consult your patient while turning on the current as to whether

they have any sensation of pain from the treatment. If the point of the electrode is touching rectal wall, or if you have entered sensitive tissue, the patient will complain of a burning or stinging sensation. Shift the point of the electrode by moving the handle one way or the other, while current is on. The patient will then inform you whether it has given the desired relief. If burning still continues shut off the current and enter at a new place. Never continue treatment of a patient when he complains of burning or stinging sensation. This will indicate to the operator that he is in mucous or sensitive tissue. If treatment should be continued an electric fissure is sure to follow, and they are very difficult to heal.

Consult your patient often while giving treatment, as to whether you are hurting him. He will undoubtedly complain of pain or unpleasant sensations from the piles which are protruding. Determine whether pain is from the protruding piles or from your treatment.

After treatment replace hemorrhoids; treat with Saratoga ointment. Give the patient a tube of Saratoga ointment with instructions to use after each bowel movement and on retiring at night. Be sure to have him replace piles, should they protrude after he leaves your office. The hemorrhoid will disappear in from two to three days after the galvanic application.

There should be no pain by this method during treatment or afterwards, and the patient need not be confined to the home. Two or three days should intervene before you treat the remaining hemorrhoids.

AFTER-TREATMENT OF HEMORRHOIDS

It may be necessary to give a second treatment in some cases where the hemorrhoid does not totally disappear or where basic hemorrhoidal tissue remains.

A careful examination should be made ten days to two weeks after first treatment. If hemorrhoidal tissue remains, an injection of ½ to 1% novocaine may be given followed by a five milliampere treatment with the short electrode.

Should the hemorrhoid be of the bleeding type and the bleeding continue after two days have elapsed following the first treatment, or if the hemorrhoid does not disappear in from 4 to 6 days after treatment, it is an indication that insufficient current has been applied.

RESULTS OF TREATMENT

Although the method described here has been held as a secret method since its conception, it is purely scientific in nature and the function of the elements employed easily understood.

The galvanic current (negative pole), introduced into the interior of the hemorrhoid and contacting with the water content of the blood generates hydrogen gas (Sodium Hydroxid-Na O H) which destroys the organized structure and capillary circulation of the hemorrhoid. This produces, first the liquefication, and then the hardening of the hemorrhoidal body. These conditions cause the disappearance of the hemorrhoid in one of two ways.

A large hemorrhoid will rupture, discharging its content, which will appear in the stool as small, dark particles having the aspect of coffee grounds. The base will then contract and prevent the patient from experiencing any pain or soreness. A small hemorrhoid will usually disappear by absorption in a manner similar to that of an unruptured blood blister or any external portion of the body.

Pure hemorrhoidal tissue has no nerves. This makes it possible to introduce the electrode into the tumor without the patient experiencing any pain therefrom. Five to ten milliamperes may be given without any anesthetic. The author sometimes treats the smaller hemorrhoids without using the injection of ½ to 1% of novocaine, but the generation of hydrogen gas is much greater if the injection is employed. Dut to the increased aqua content of the hemorrhoid by the injection, the hemorrhoid is distended. Thus it is easier to treat and there is less danger of causing an electric fissure brought about by the electrode coming in contact with the walls of the anus.

It must be borne in mind, however, that the injection of novocaine anesthetizes the tissue and that as a result the patient will be incapable of guiding or aiding you in determining whether you are introducing the electrode into mucous membrane, and you will be compelled to rely on your anatomical and pathological knowledge of the structure.

This treatment cannot fail to give the desired results if properly and thoroughly applied.

INTERNAL HEMORRHOIDS

Internal hemorrhoids are treated through the Brinkerhoff speculum. Insert speculum with slide against the hemorrhoid. Be sure to insert speculum completely in the rectum. Slowly withdraw slide until hemorrhoid drops into body of speculum, tell patient to strain down, and this will distend it with blood. With extension of hypodermic inject hemorrhoid with one-half of one percent novocaine solution. The patient is prepared for treatment as in protruding piles.

Insert electrode through speculum into hemorrhoid and slowly turn on current as direct in treating external piles. The same care must be taken to keep point of electrode from mucous wall of rectum. Patient will inform you, if you are in contact with the wall, of a burning sensation.

It may be necessary to give more than one galvanic treatment in each hemorrhoid. This will depend upon the size. Never attempt to rotate speculum while the slide is withdrawn.

If you wish to treat another hemorrhoid in close proximity, withdraw speculum, replace slide and insert again, examining as before. After treatment should be given with Saratoga ointment injected in the rectum.

STRANGULATED HEMORRHOIDS

Cause—Strangulated hemorrhoids are caused by a patient who has hemorrhoids and who has a tight external sphincter muscle. Straining at stool causes them to protrude, the sphincter tightens down and prevents their returning to the anus. The patient neglects to replace them immediately because they are painful and the attempt to replace causes severe suffering. The hemorrhoids continue to fill with blood, the sphincter tightens, due to irritation, until circulation is shut off, the blood congeals in the tumor, the tumor becomes black and hard to the touch, and the patient suffers intense pain.

Treatment—Do not try to replace these hemorrhoids. You would find it almost impossible and if you succeeded you would be causing your patient more pain.

Incise the tumor with a puncture so as to relieve the tension on the tumor, apply Mecca ointment on a large cotton pad. If rectum is not too sensitive, attempt to insert some of the Mecca ointment with pile pipe into the anus.

If you have made a free incision and have expelled the clots, it will be necessary for you to be on your guard against any hemorrhage, although there is not much danger due to the severe contraction of the external sphincter muscle. You should see your patient and give treatment every day. He will probably complain and you will notice a very unpleasant odor from the disintegrating tumors. Clip off all sloughing edges of tumor with dressing forceps and curved scissors. Do not be alarmed when this unpleasant odor occurs for fear of infection.

In some cases of strangulated hemorrhoids, when the patient is suffering intense pain at the time, the tumors may be allowed to rupture themselves, which they will do in a day or so, applying the

same treatment of Mecca ointment, as described above. In severe and painful cases where the patient is suffering intense pain, use Mecca ointment with eight grains anesthesin to the ounce. This gives the patient relief. These patients should be kept off their feet during convalescence.

CONCLUSION AND REVIEW

1. You must be perfectly familiar with the anatomy and physiology of the rectum and surrounding tissues. Do not attempt to treat pathological conditions until you know normal structures and their functions. If you do, you are liable to make serious mistakes that cause you trouble.

2. In turning on the galvanic current, be sure to turn it on slowly to avoid shock to your patient. The same rule is to be observed when turning off the current.

3. Consult your patient often in treating hemorrhoids to find out if there is any burning sensation. If there is, this will indicate that you are in healthy tissue, and you may cause an electric fissure which is difficult to heal.

4. Do not remove electrode from hemorrhoid until you have shut off the current. If you do, patient will get a shock.

5. Be careful not to use positive current on electrode in hemorrhoid. If you do, you will get no results and will destroy electrode. It will absorb in tissue.

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Research Department
H. G. FISCHER & COMPANY, Inc.
Physical Therapy Headquarters
2323-37 Wabansia Avenue
Chicago, Illinois

Form 1292A

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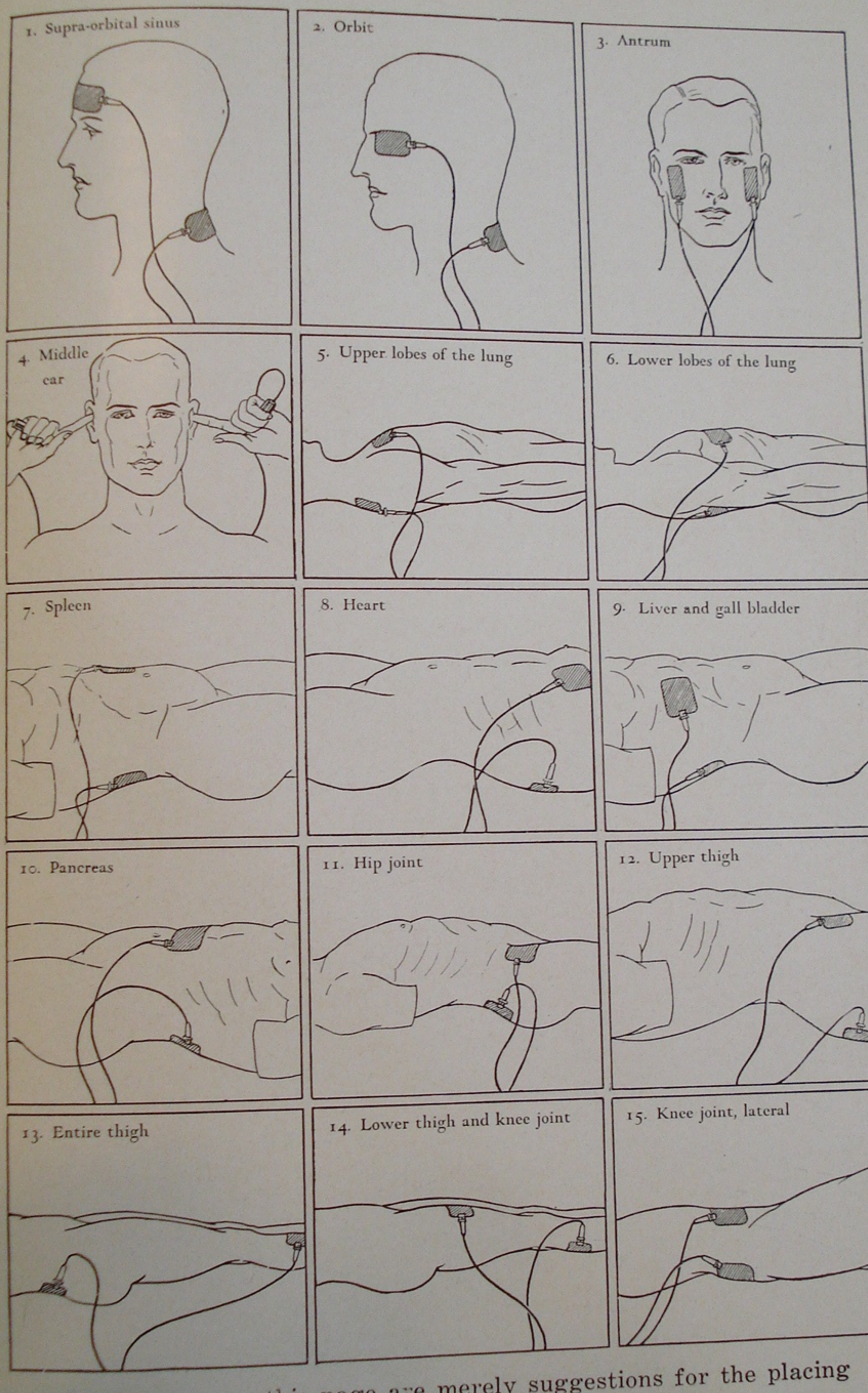
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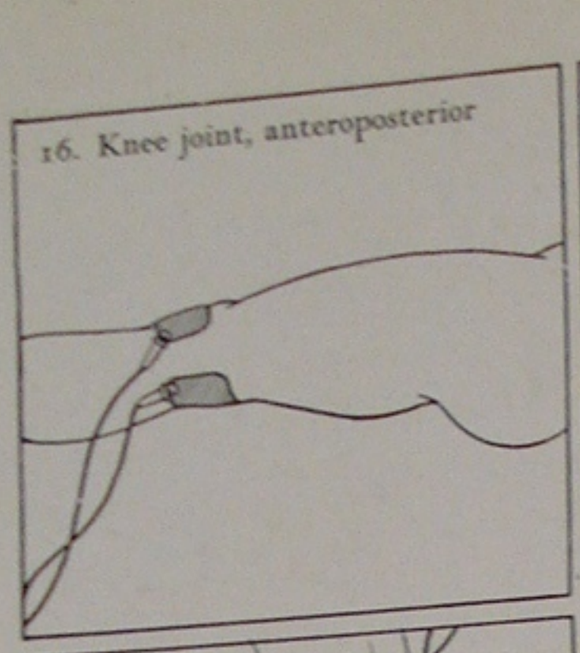
T. HOWARD PLANK, M. D.

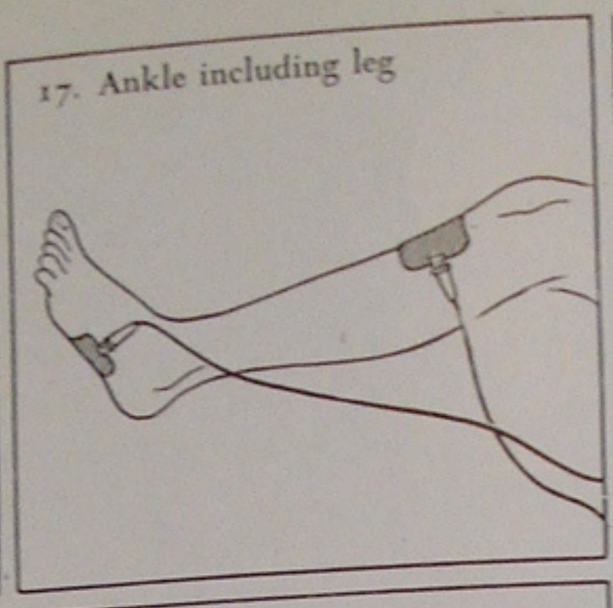
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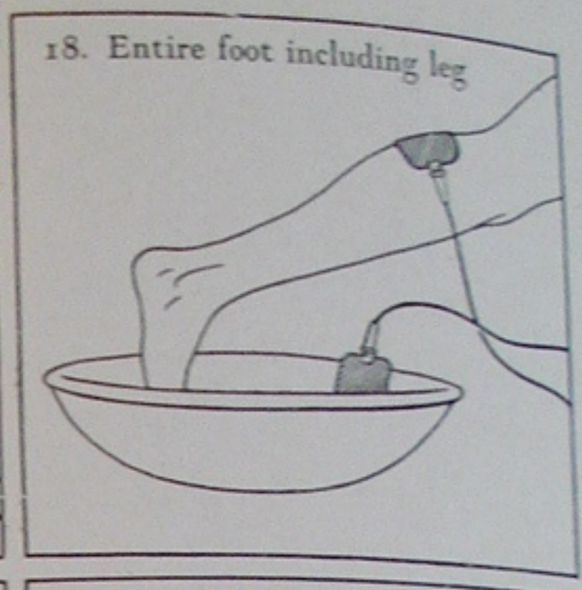


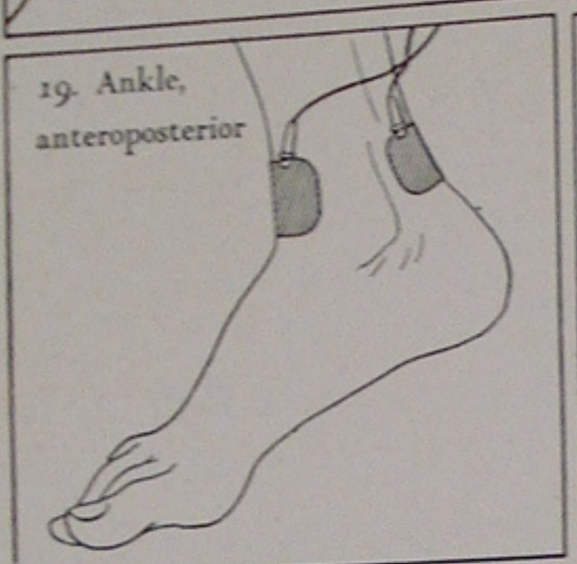
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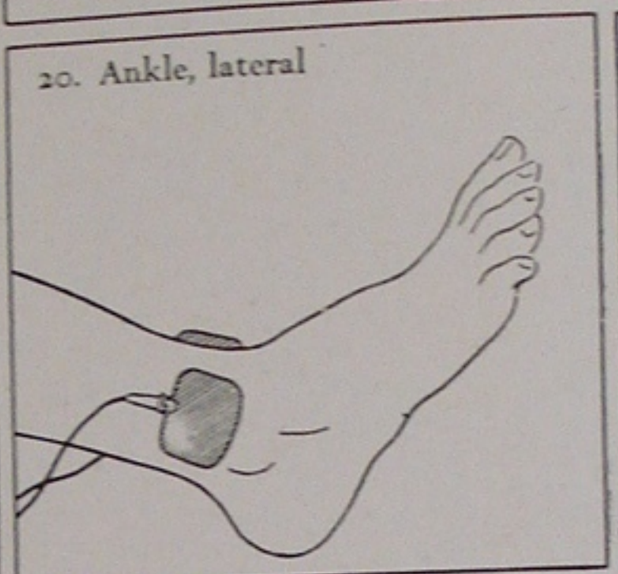
Plate III

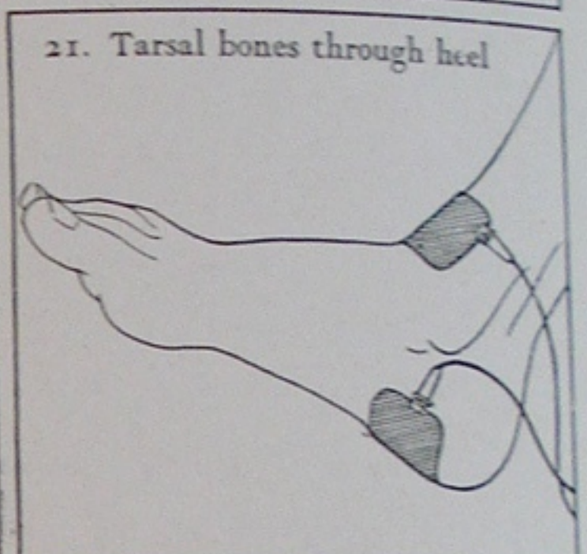


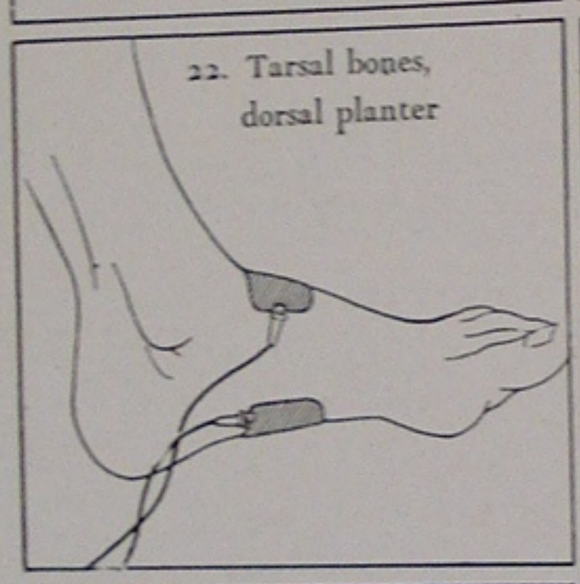


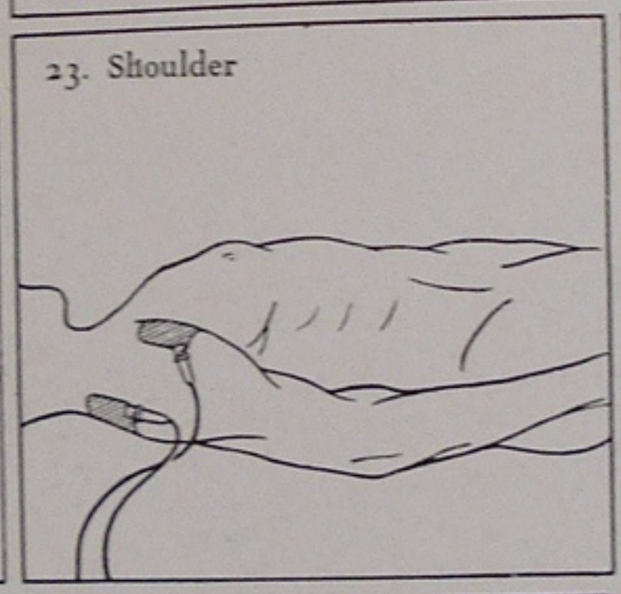


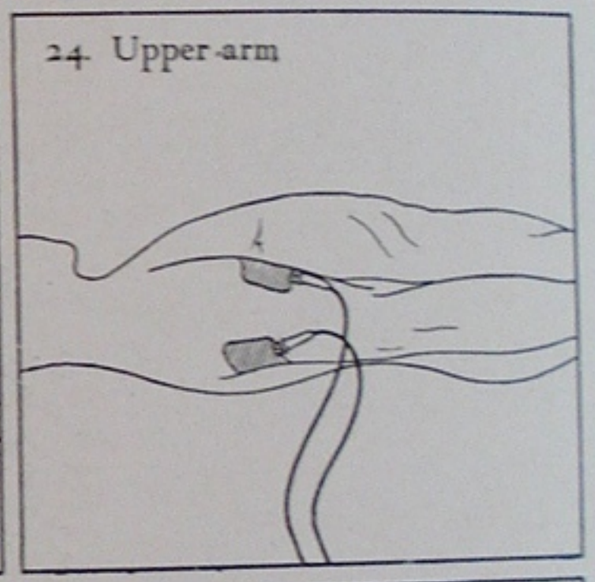


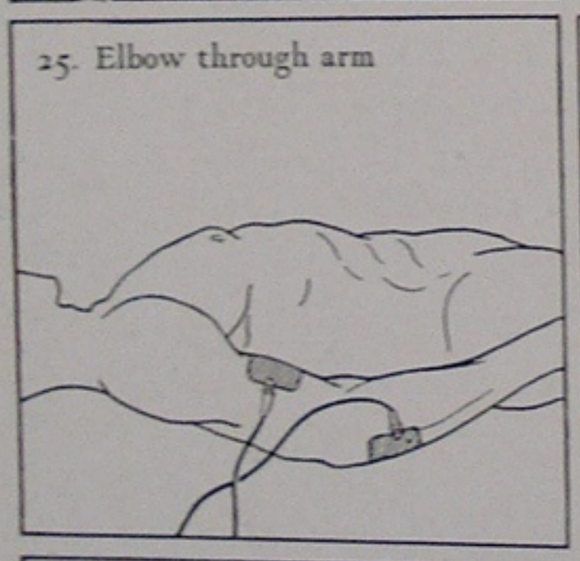


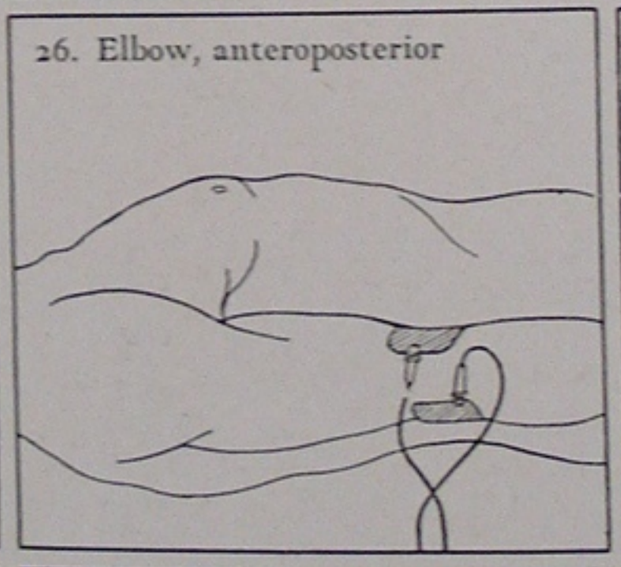


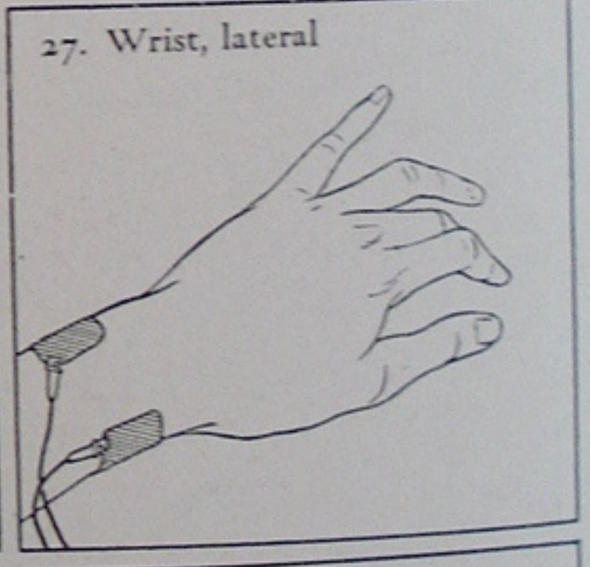


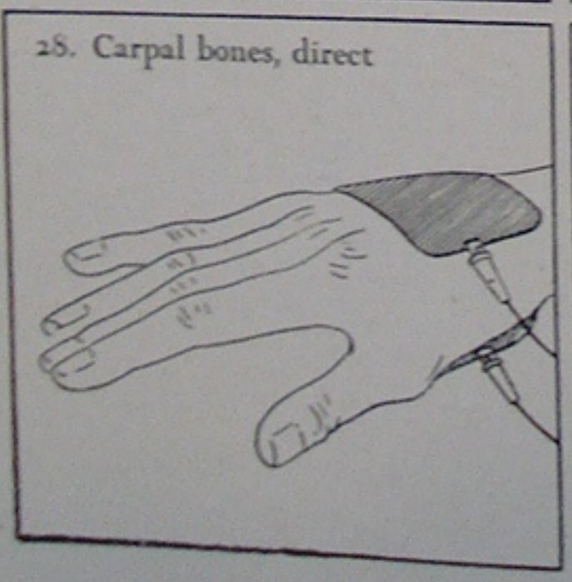


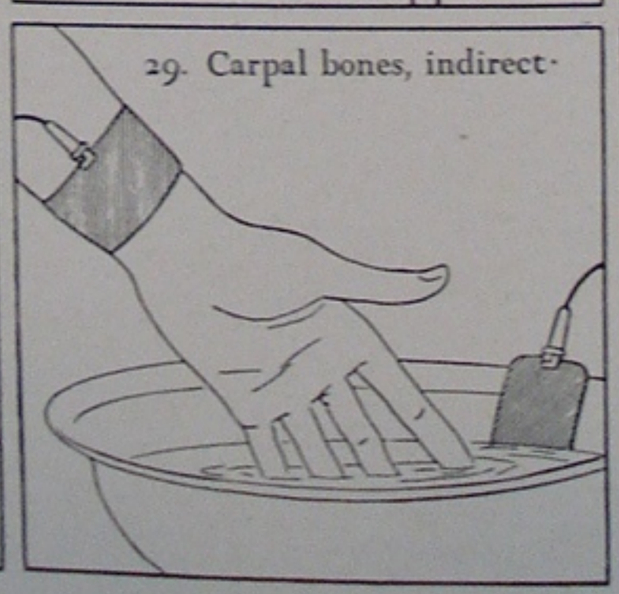








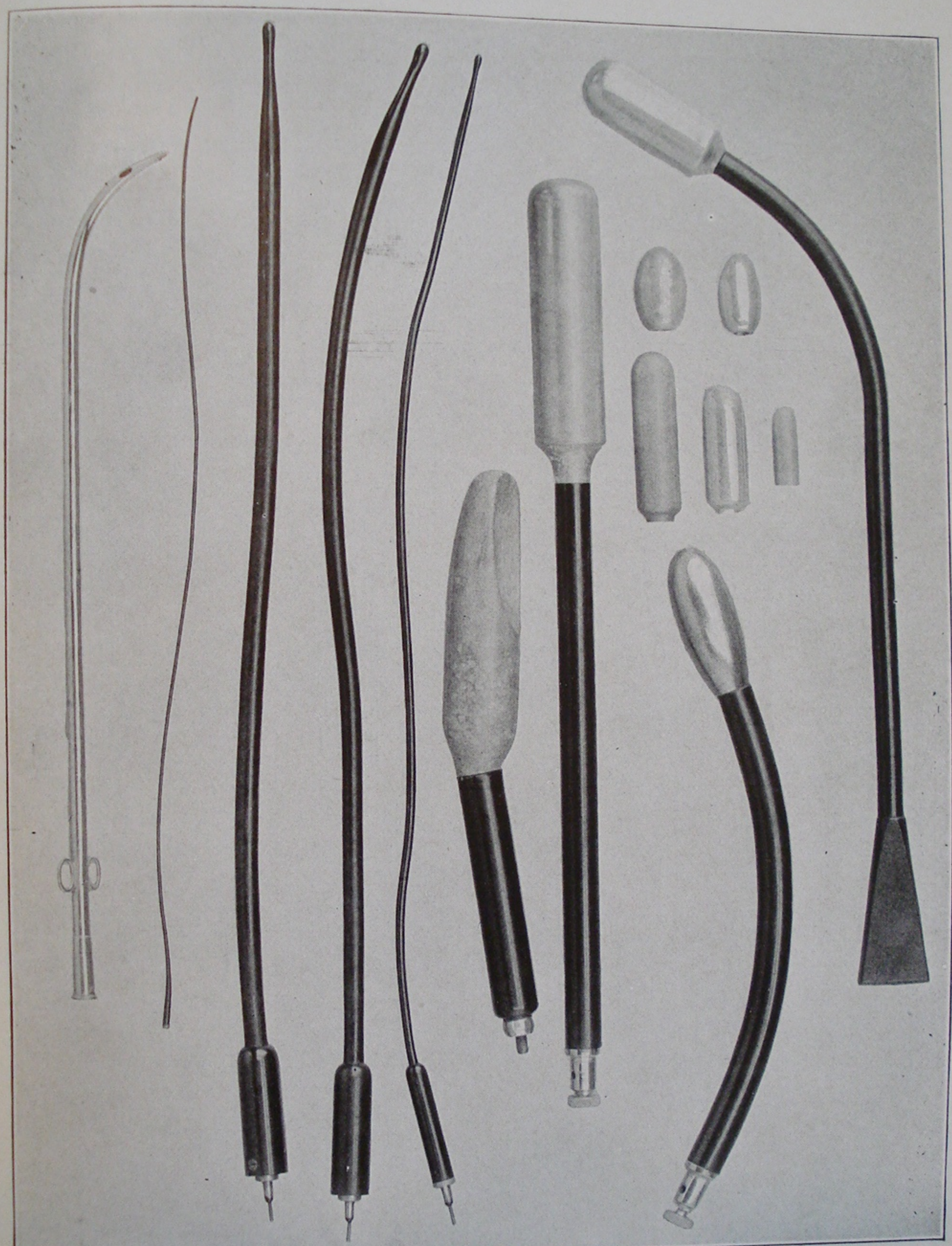






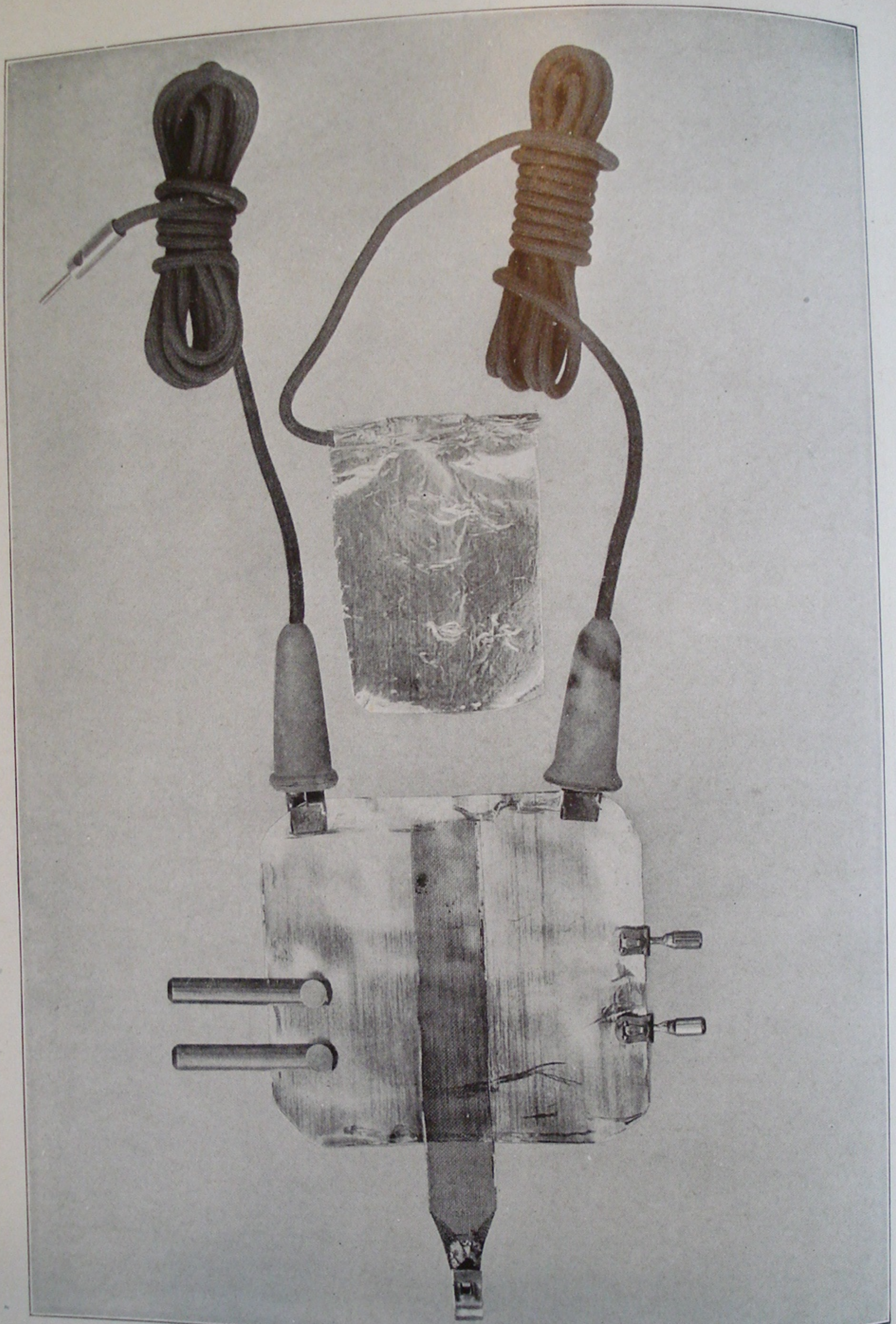
The pictures on this page are merely suggestions for the placing of electrodes. Each case must be individualized.

Plate IV



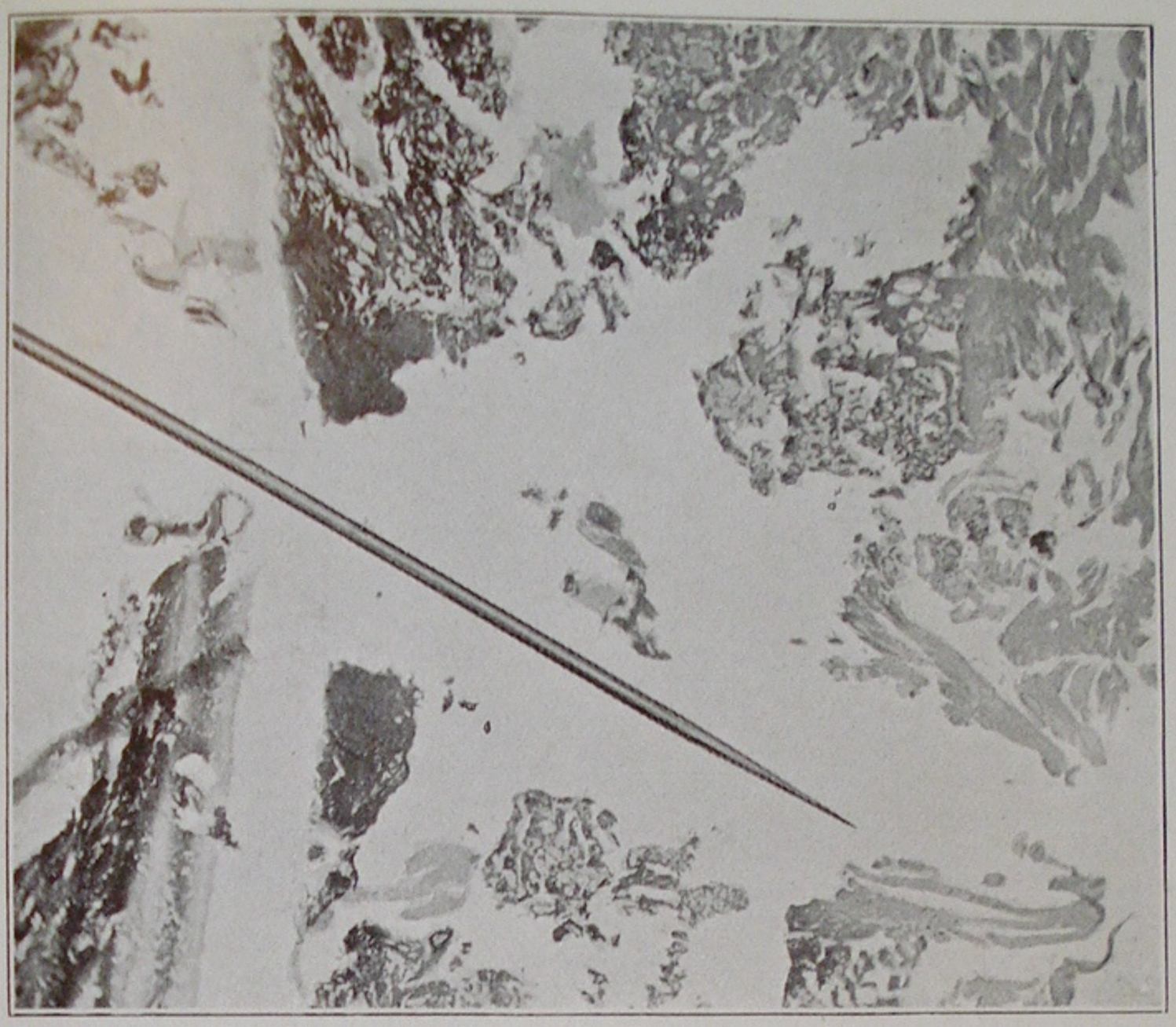
Dilating catheter, heat bougies for treating strictures, diathermy electrodes for vaginal and rectal treatments.

Plate V



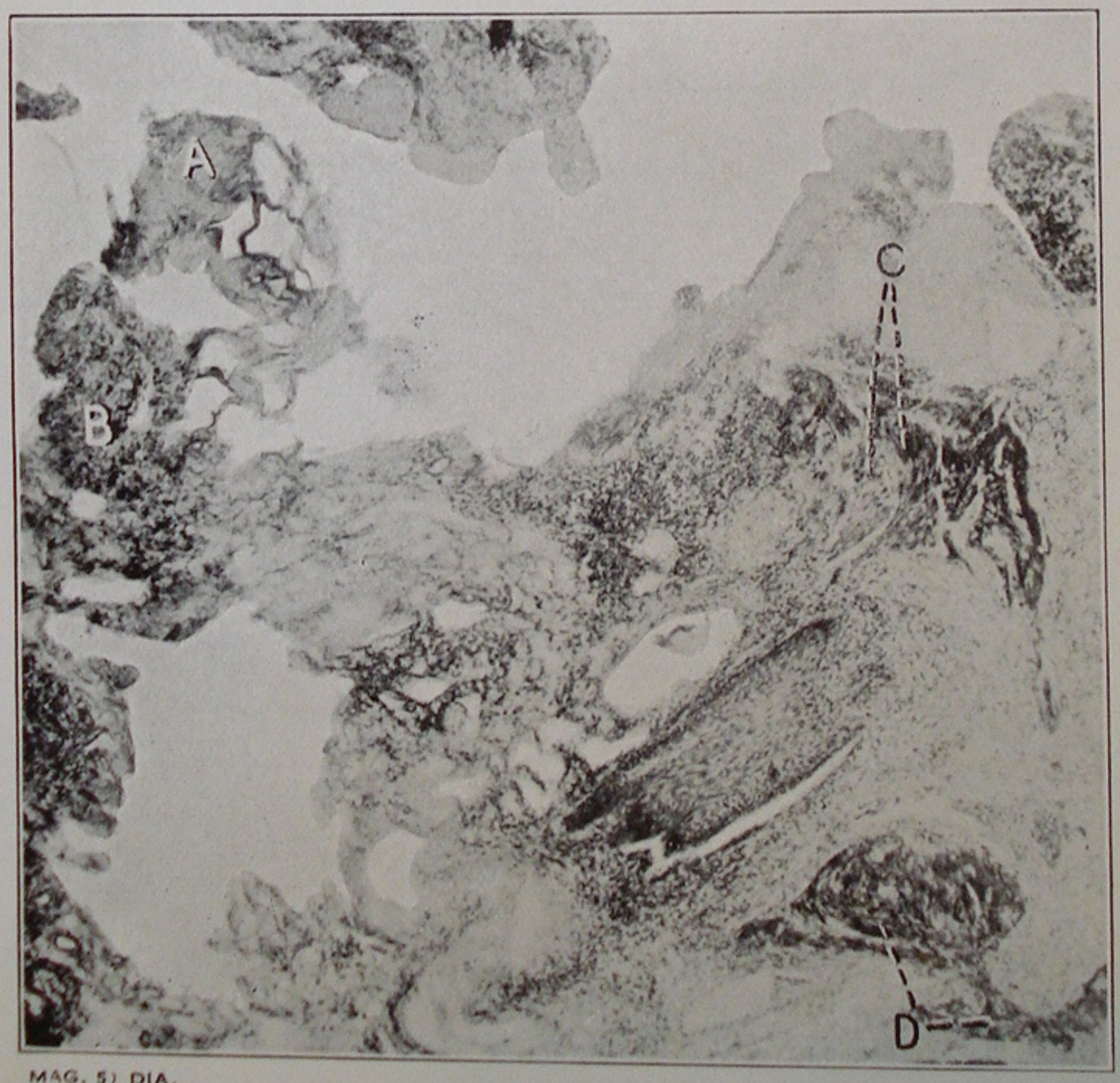
Various connectors and methods of making connections.

Plate VI



MAG. 21 DIA.

Area of cauterization with charring of the edges and necrosis of the balance of the tissue.



MAG. 51 DIA.

(a) Necrosis. (b) Contraction of fibrous tissue. (c) Contraction and desiccation of tumor cells. (d) Contraction of tumor cells showing distance of normal from coagulated tissue.

Plate IX



MAG. 70 DIA.

Coagulation showing separation of epithelial layer from corium with necrosis of epithelial layer. Lower right side of picture shows contraction and desiccation with separation of cells.



MAG. 230 DIA.

(a) Shows necrosis. (b) Charring. (c) Contraction with formation of elongated spindle cells. (d) Blood cells.

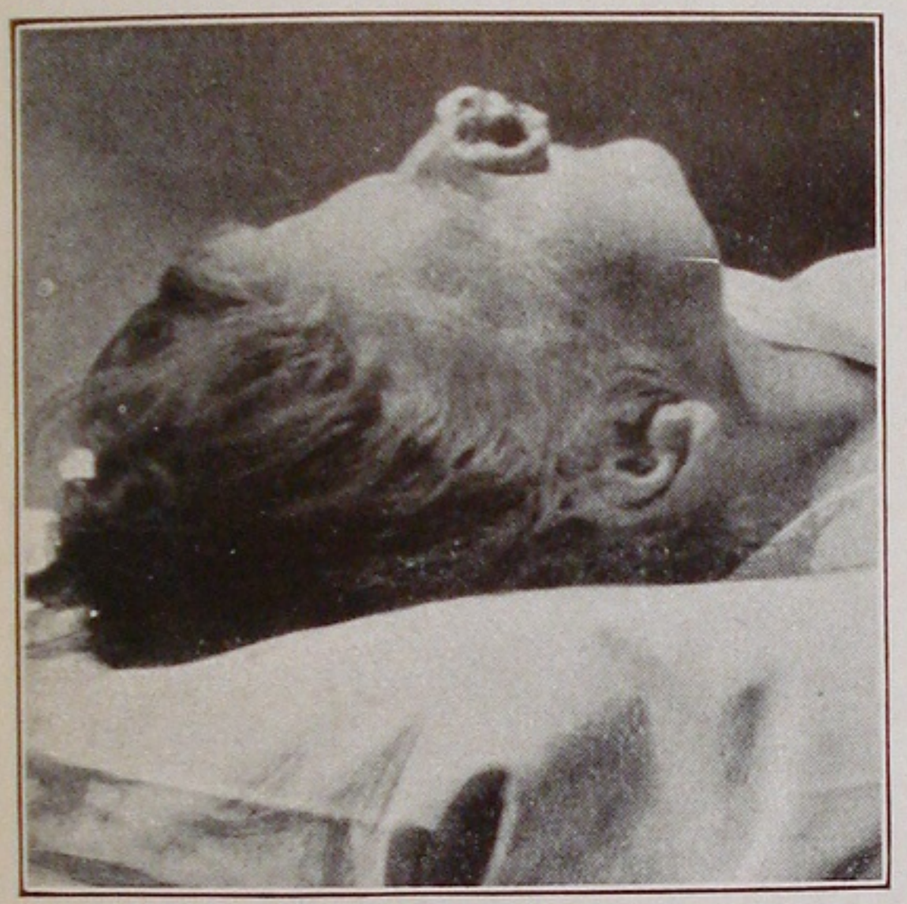
Plate X



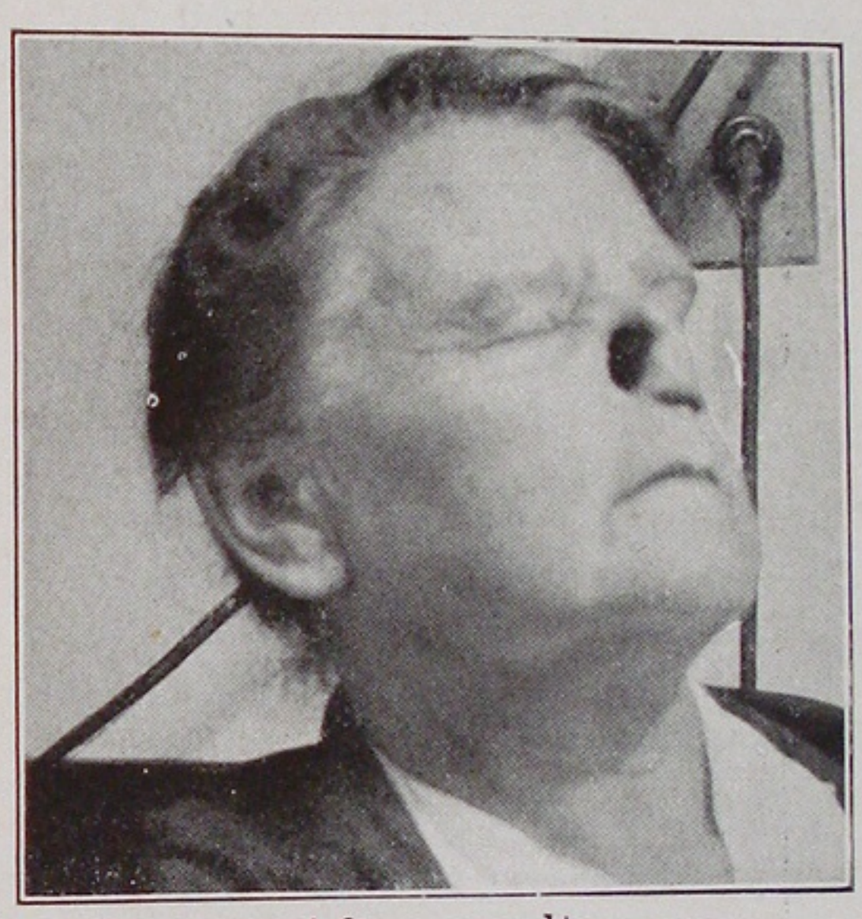
Basal-celled carcinoma.



After result.



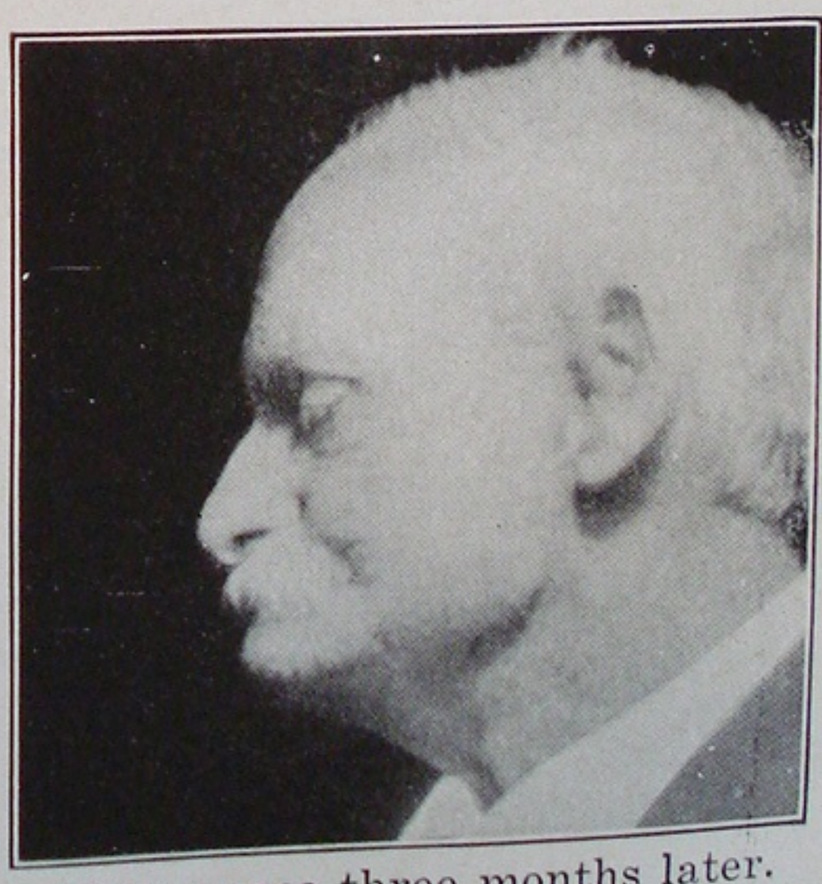
Basal-celled carcinoma.



After result.



Squamous-celled carcinoma.



Appearance three months later.

Plate XXVII



Squamous-celled carcinoma.



Appearance two years later.



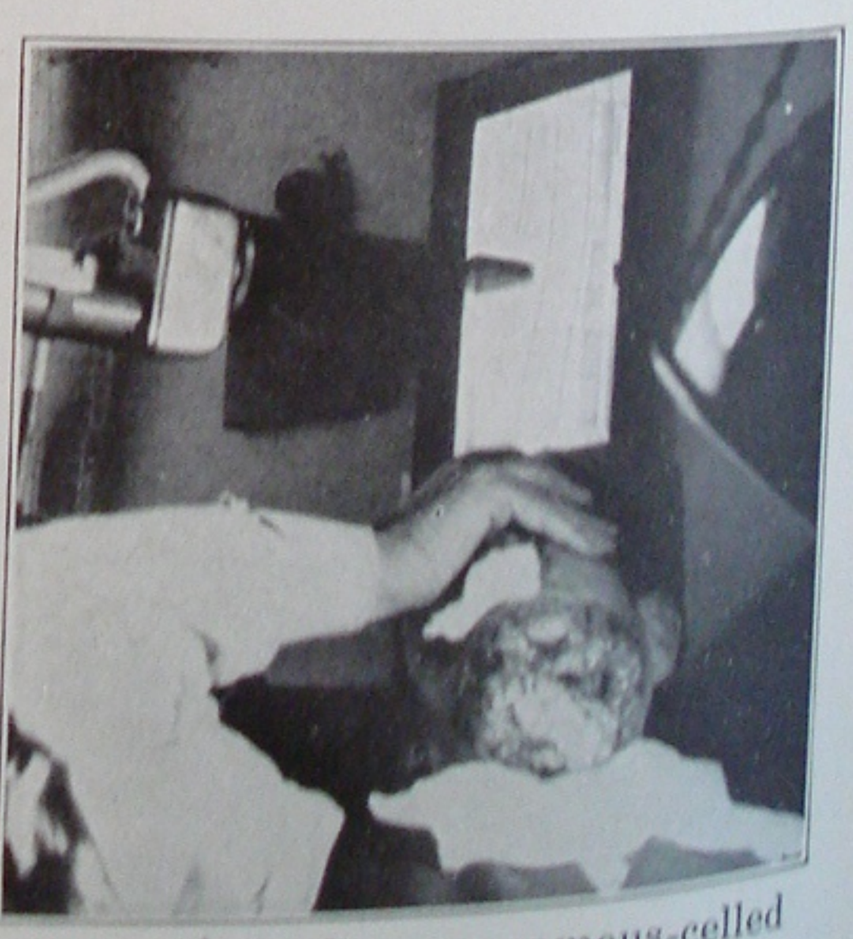
Basal-celled carcinoma.



Basal-celled carcinoma.



Basal-celled carcinoma.



Metastasis from squamous-celled carcinoma of the tongue.

Plate XXVIII



Carcinoma eighteen years' standing. Front view.



Lateral view.



Carcinoma of the upper lip and alveolar process.



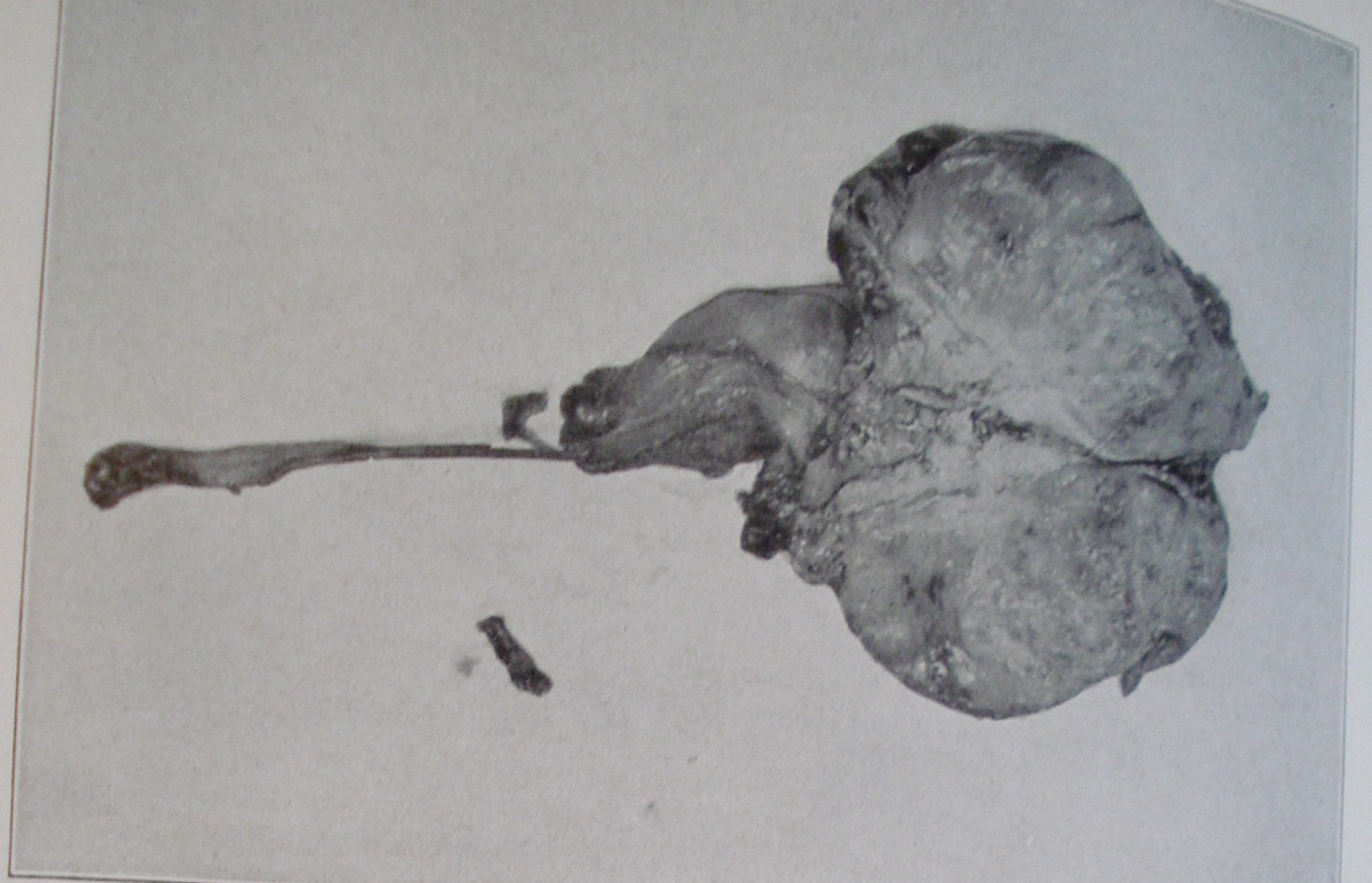
Showing minimum of scar.



Basal-celled carcinoma of nose.



Result three months later.



Adeno-sarcoma of testicle. Gross section.



Gross section of upper picture as removed by cautery.

Plate XXX



Roentgen-ray burns twenty-two years old.

Carcinoma of male breast metastasized from finger opposite.

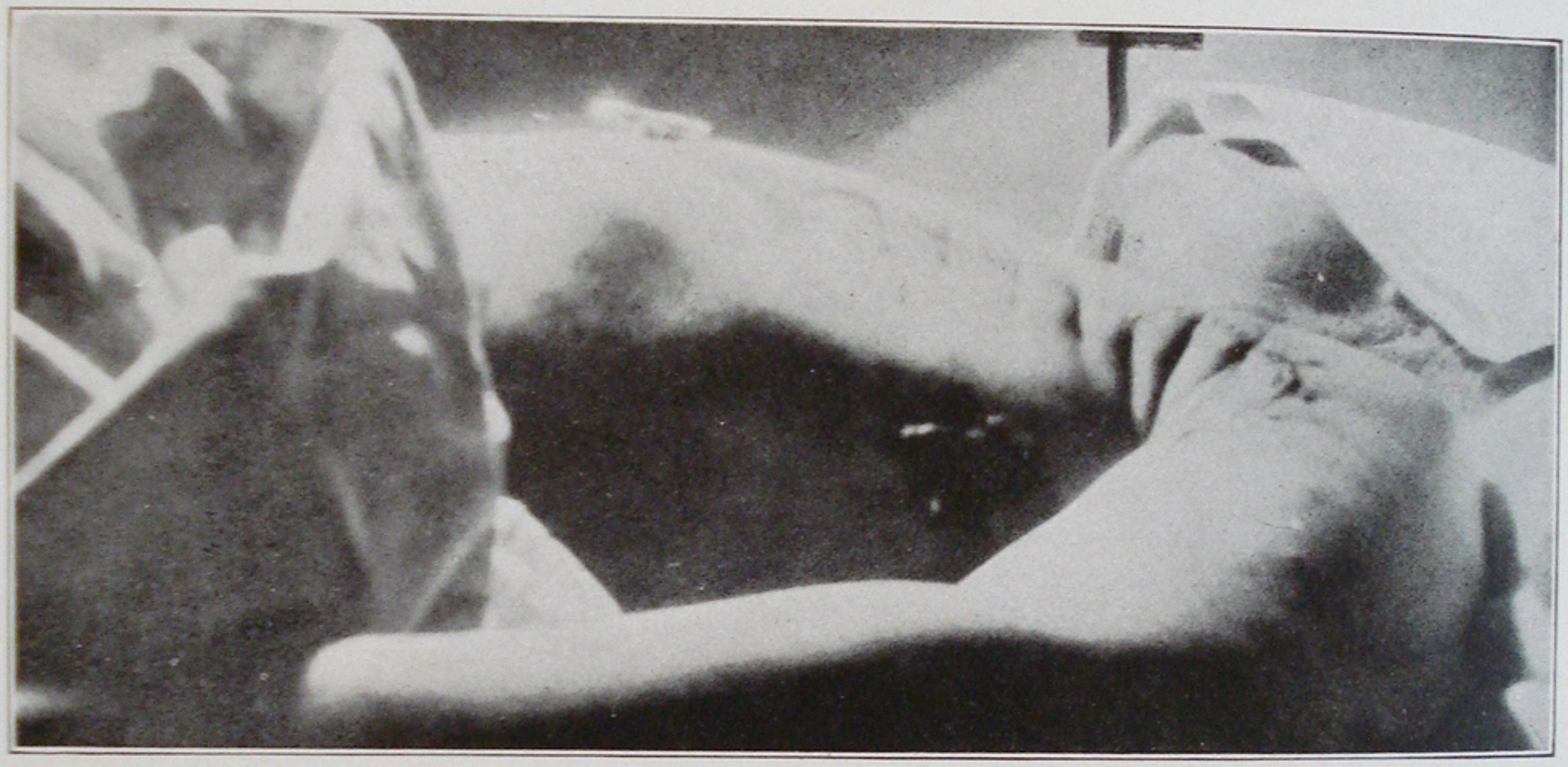




Appearance two months after treatment with Oudin current and actinic rays.



Block dissection of breast and axillary contents with Percy cautery.

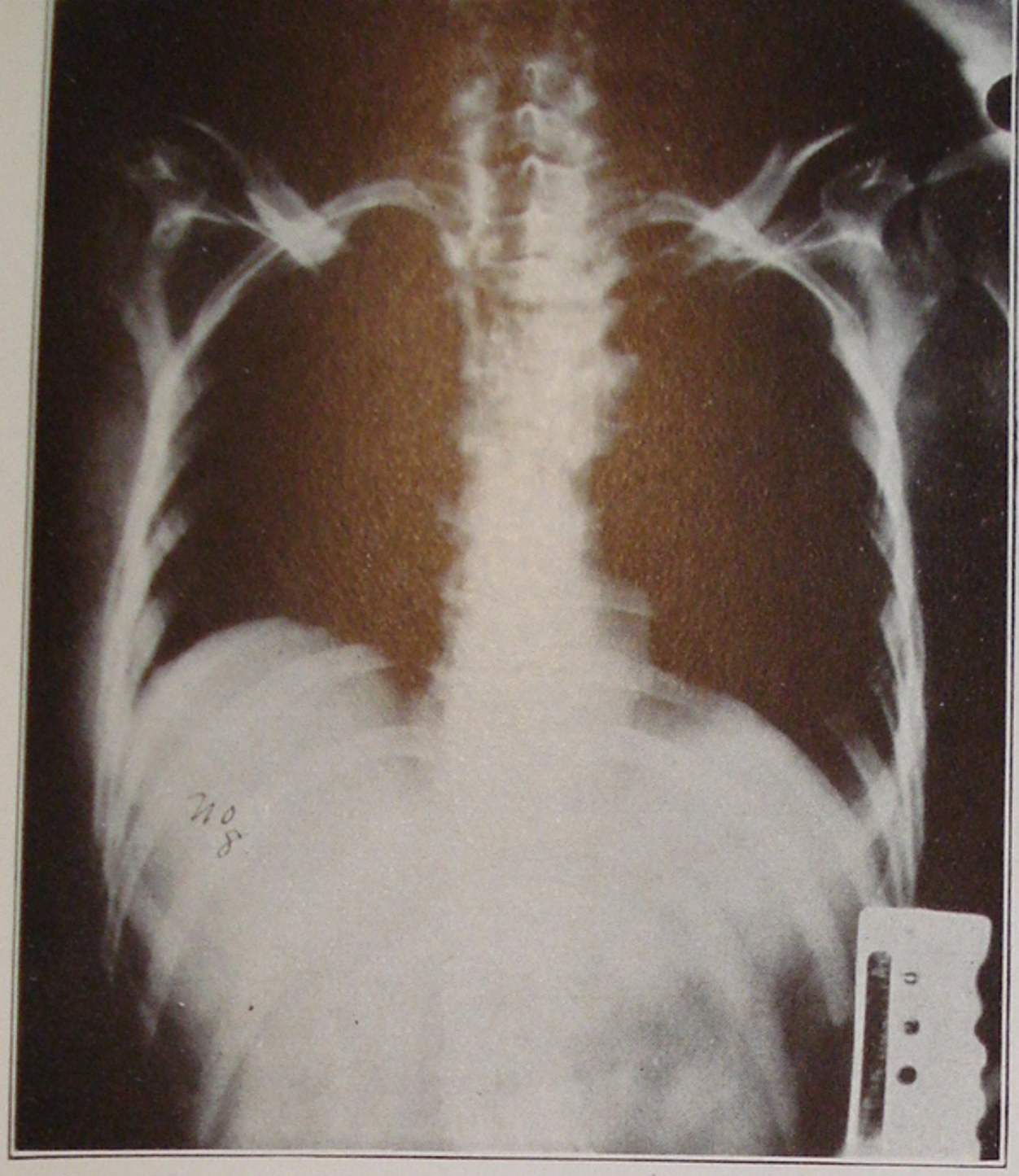


Appearance immediately after operation.

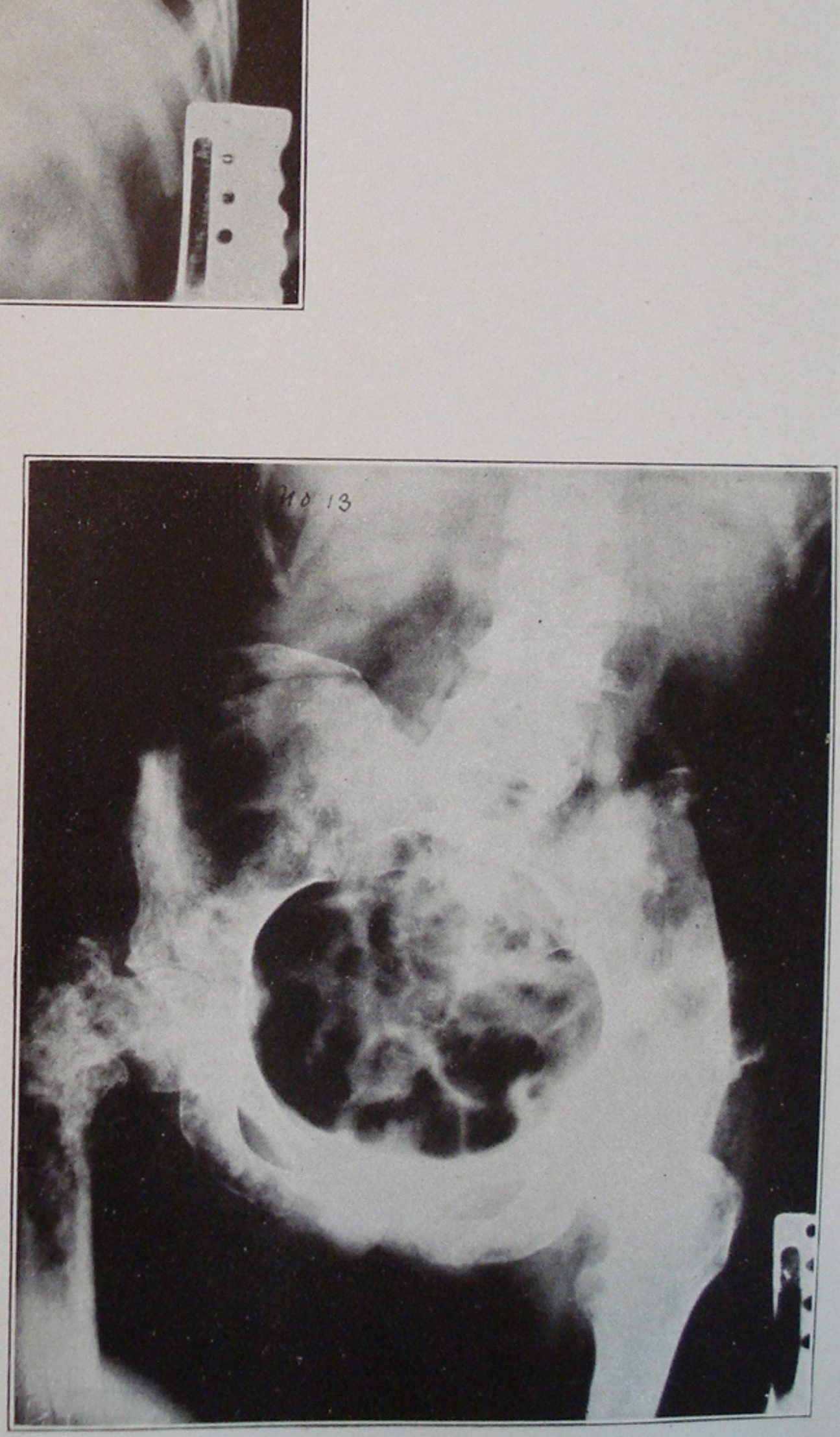


Appearance two weeks later showing freedom of motion.

Plate XXXII



Carcinoma of upper dorsal vertebrae. Metastatic from right breast.



Same case as above metastatic to lumbar vertebrae, pelvis, and upper third of femur.

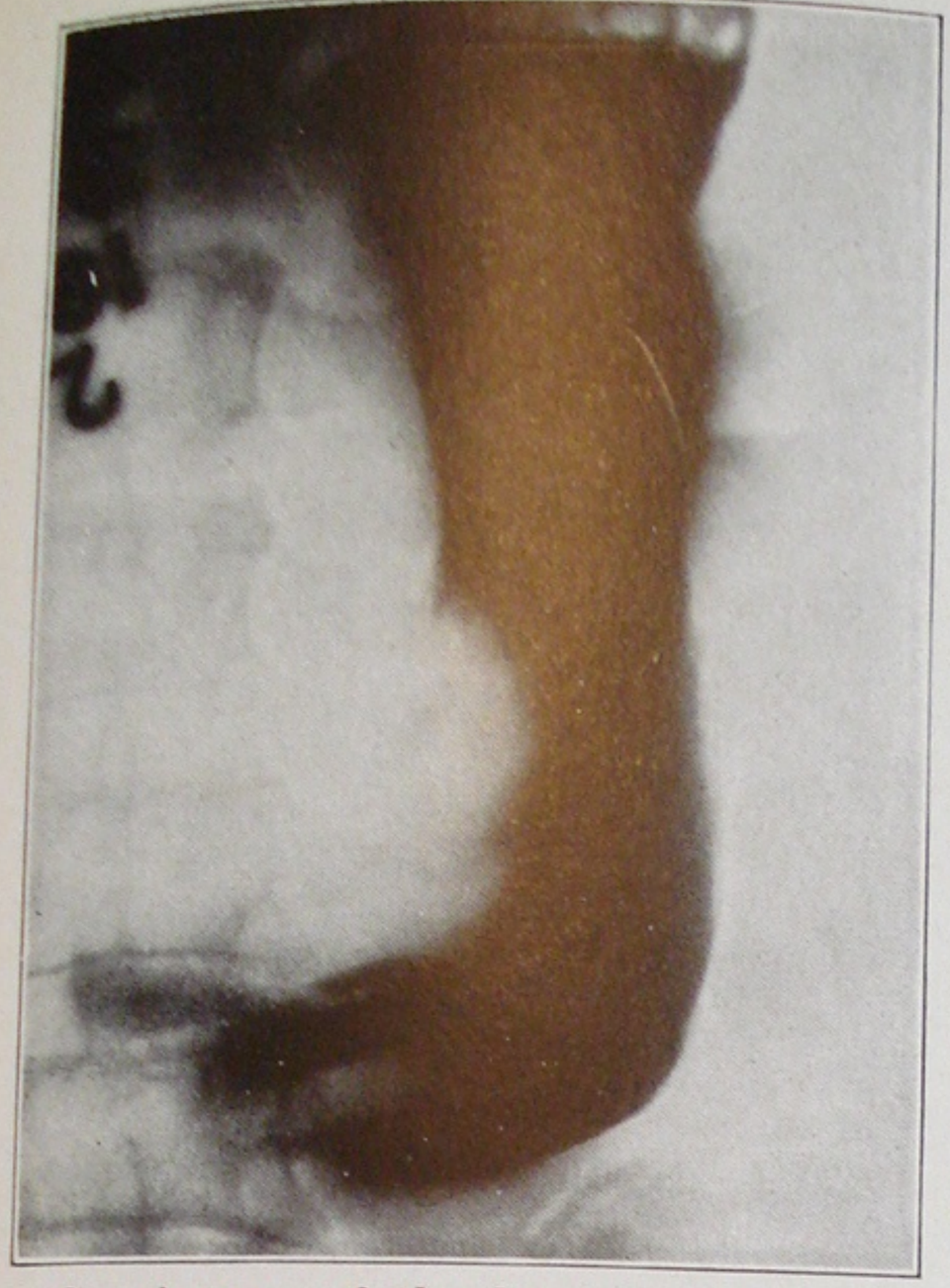


Carcinoma of the esophagus.



Roentgenogram taken three months later after radium treatment.

Plate XXXIV



Carcinoma of the lesser curvature
of the stomach and pyloris.



Carcinoma of cardiac end
of stomach.

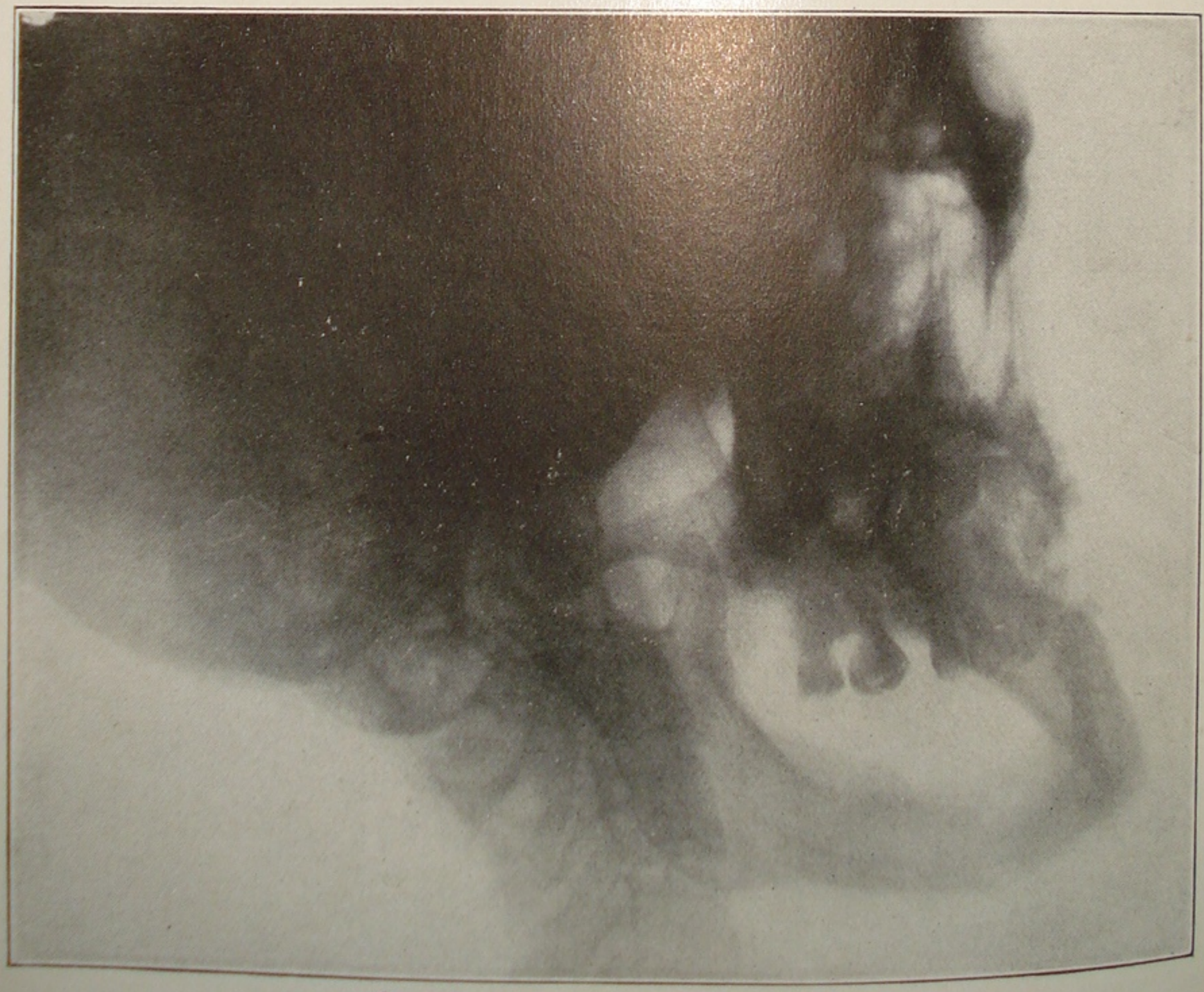


Carcinoma of the greater curvature of stomach and pyloris.

Plate XXXV



Carcinoma of cervical vertebrae. Metastatic from larynx.



Carcinoma of lower maxilla.



Sarcoma of face.



Same case showing metastasis to skull.



Sarcoma of ethmoid spreading to nose and antrum.



Roentgenogram of same.

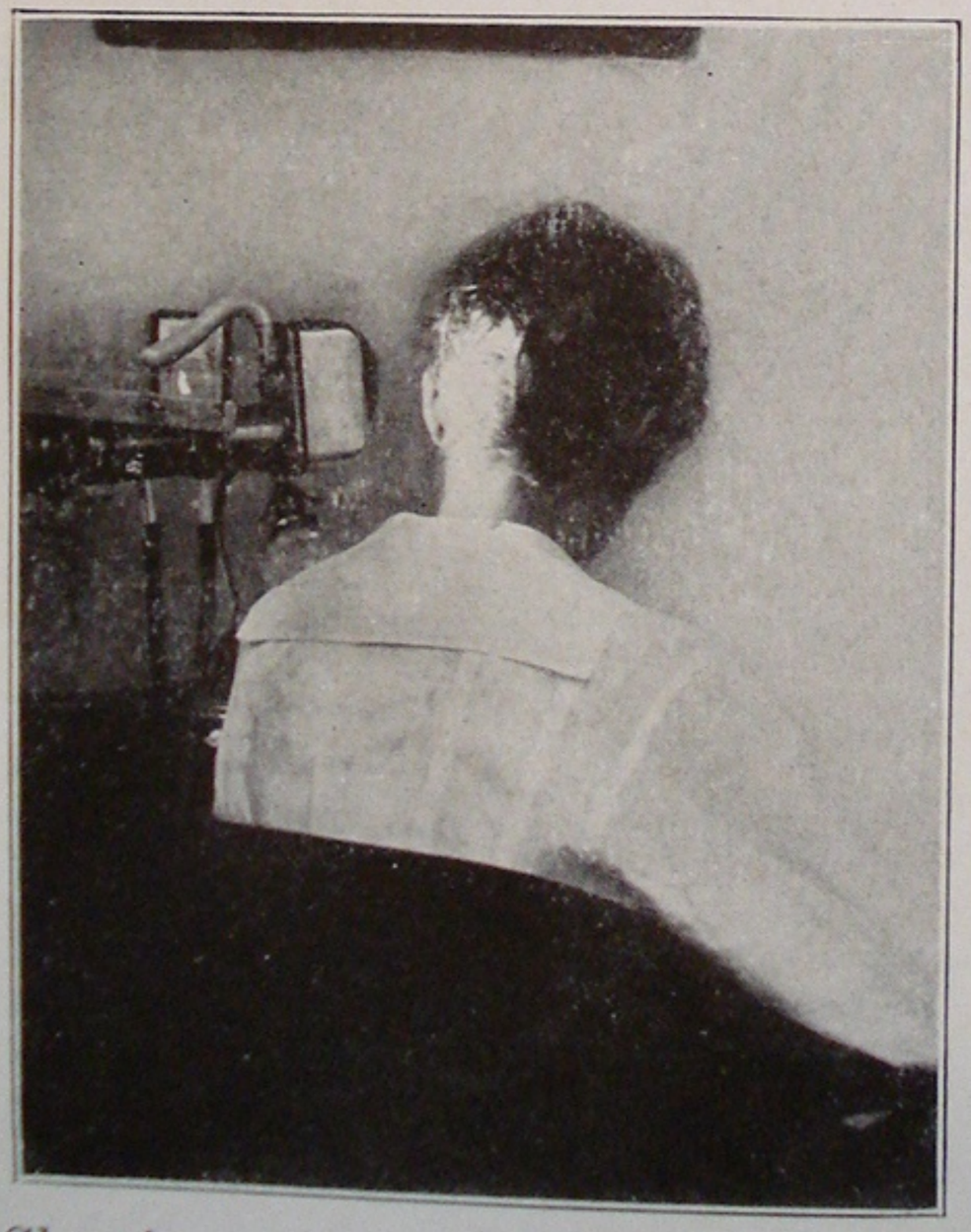
Plate XXXVII



Appearance when patient came to us.



The "x" shows the exposed brain tissue, above which is the cauterized area.



Showing position of water-cooled lamp when treating granulating wounds. Wound nearly healed.



The "x" shows same area as in picture above. Wound healed.

Plate XXXVIII



Roentgenogram of Plate XXXVIII.

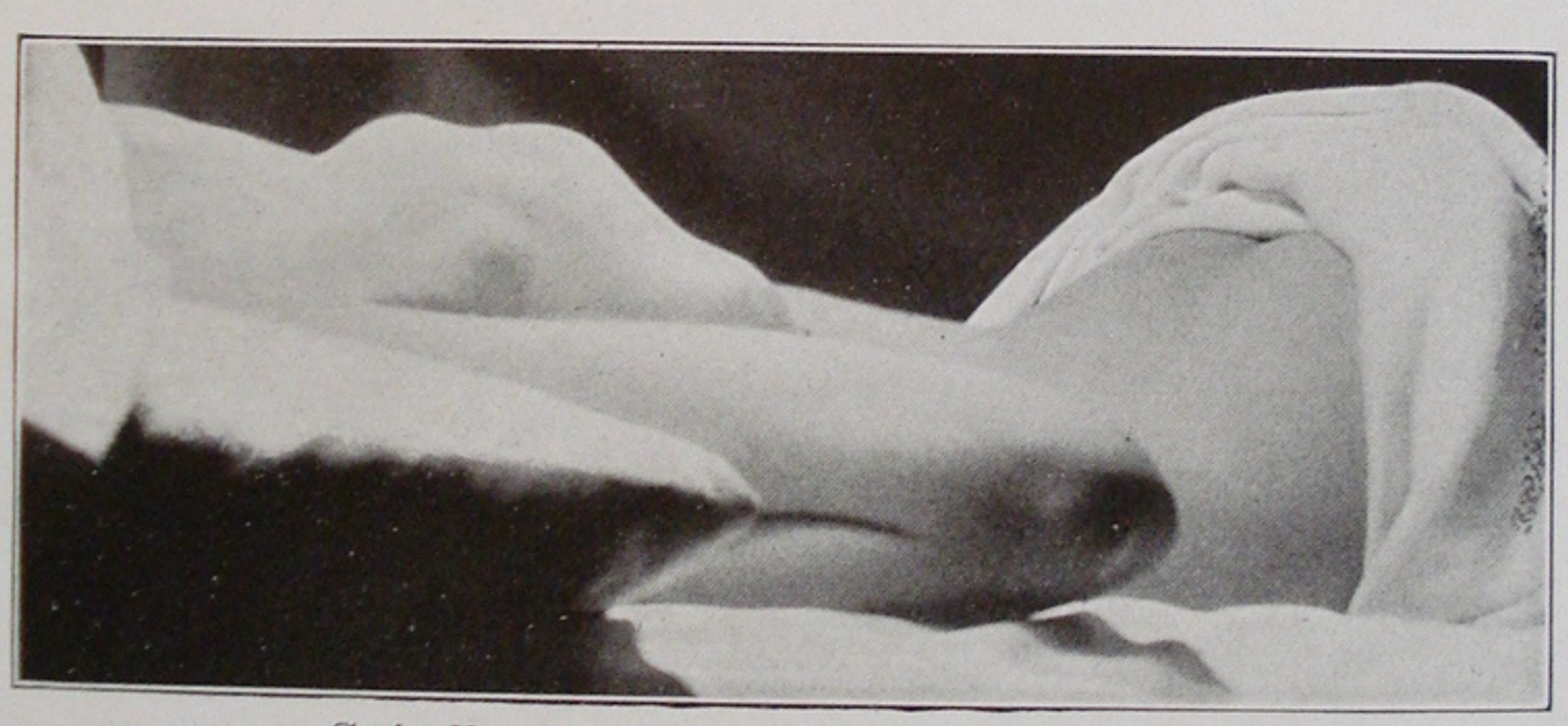


Same case as above.

Plate XXXIX



Primary sarcoma of head of femur.



Spindle-celled sarcoma of scapula.

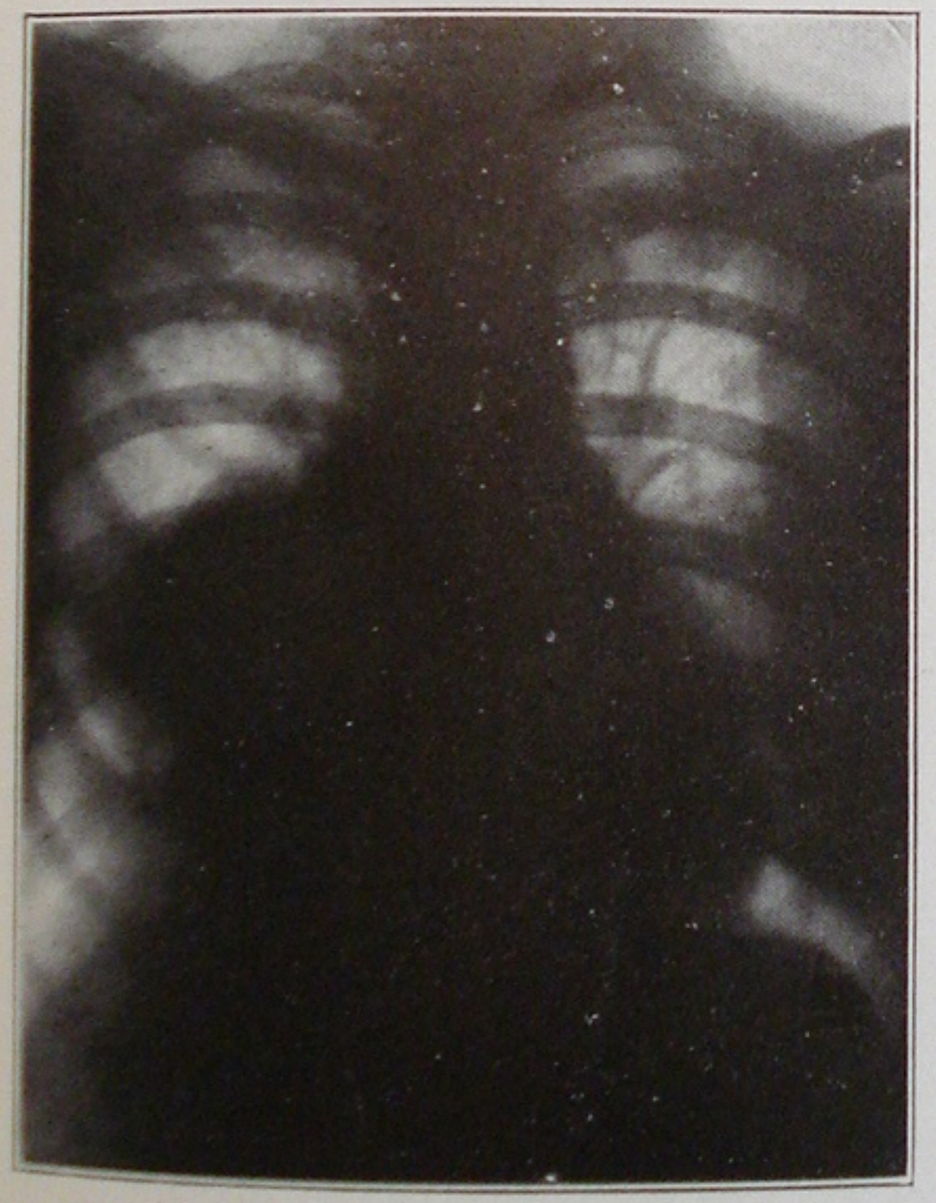


Melanoma of great toe with metastasis to inguinal glands.

Plate XL



Primary periosteal sarcoma of tibia and fibula.



Metastasis to lung one year later.



Showing growth three weeks after second roentgenogram.

Plate XLI



Showing wound one week after operation.



Showing scar as it appeared eighty-one days after operation.

Plate XLII



Multiple myeloma of femur and tibia.



Same case—lower tibia and foot.



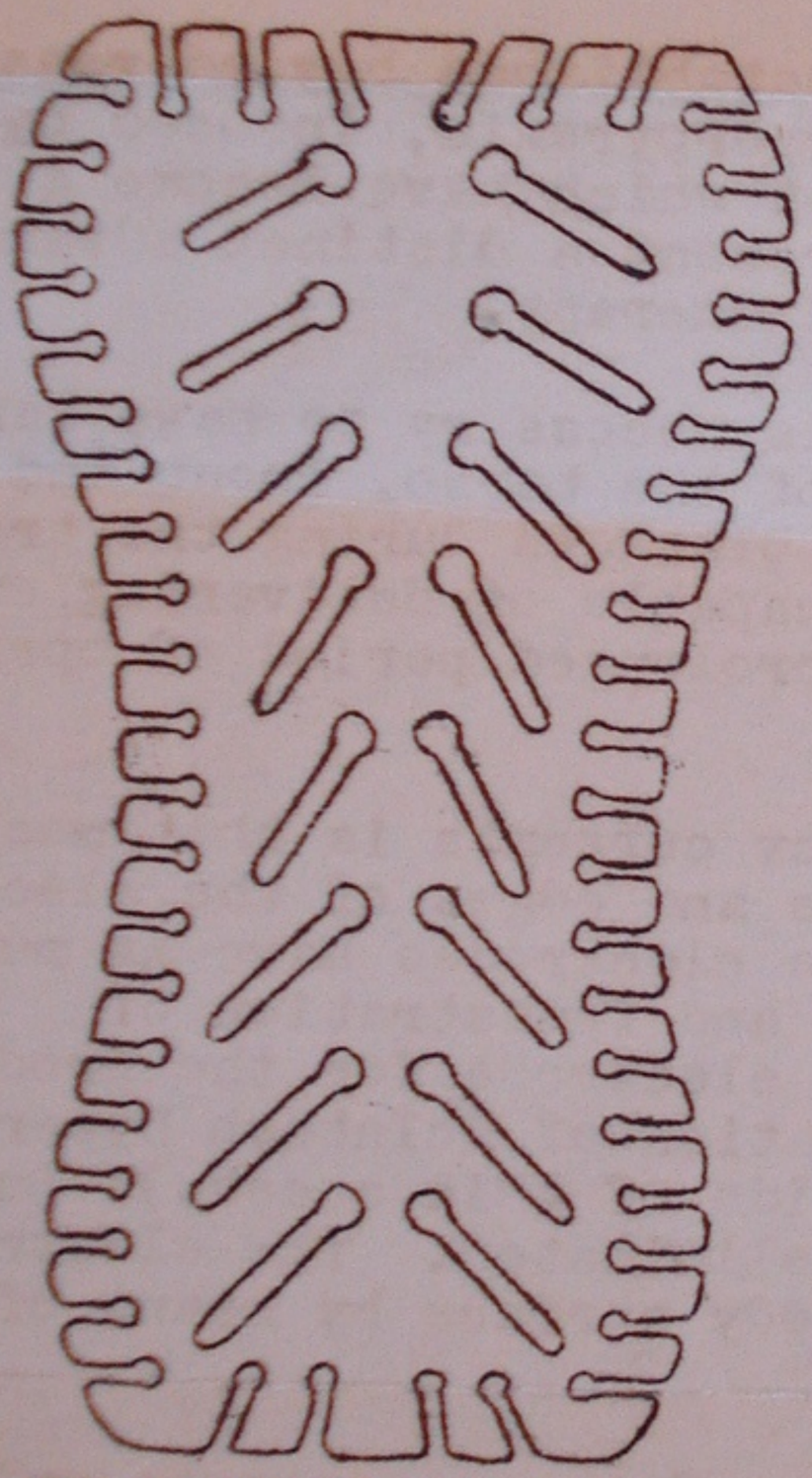
Same case as above—lower maxilla.

Plate XLIII

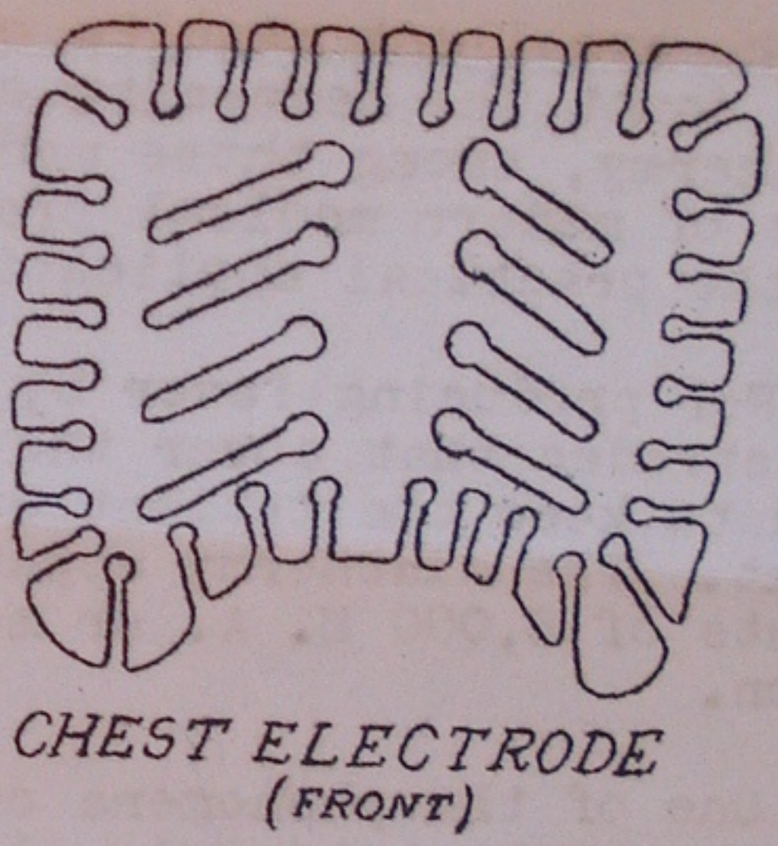


Pieces of bone destroyed by electrocoagulation. *Removed three months later.*

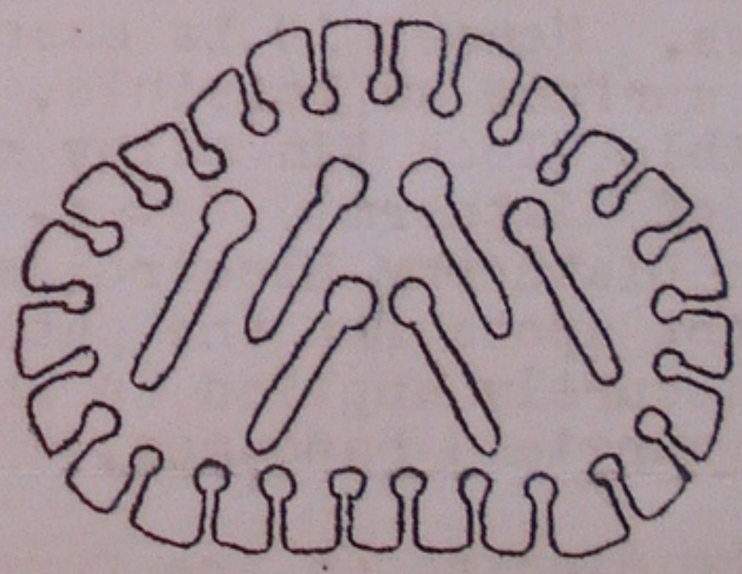
HYPERPYREXIA DIATHERMY ELECTRODES



TORSO ELECTRODE
(BACK)



CHEST ELECTRODE
(FRONT)



ABDOMINAL ELECTRODE
(FRONT)

HYPERPYREXIA DIATHERMY ELECTRODES

(Fenestrated Type)

Diathermic fever is rapidly coming to the fore as a therapeutic measure in treating cases of paresis, multiple sclerosis, allergic disease, dementia paralytica, etc. Leading authorities recognize this modality as a possible means of treating many diseases not readily amenable to other forms of treatment, and unusual success has been achieved as is evidenced by the many articles which have appeared in the various medical periodicals during the past three or four years. Of late there has been a wide acceptance of the method by the profession since clinical records have shown remarkably superior results compared with previous achievement through less effective modalities.

The excellent results obtained have established beyond reasonable doubt the necessity of including hyperpyrexia, induced by diathermy, among those modes of treatment which have become a part of modern medical practice and represent a distinct advance in the practical application of physical therapy.

For producing fever by diathermy it is necessary to have large electrodes that cover the greater part of the torso, front and back, and to keep the patient wrapped in wool blankets during the treatment. The diathermy apparatus must be capable of delivering currents of 8,000 M. A. or more -- over a prolonged period of operation.

One of the phenomena of high frequency currents is that most of the current travels along the surface and edges of the electrodes. Hence, it is essential that the electrodes have as much edge surface as possible. The notching and fenestration of flexible block tin alloy makes an ideal electrode for the production of diathermic fever. (See illustration of McIntosh Hyperpyrexia Diathermy Electrodes on reverse side of this sheet.) Burns and hot spots for the patient are thus eliminated. The electrodes are securely applied to the patient's body surface by means of wide surgical bandages.

The electrodes are furnished in a set of three separate units -- one large electrode 11-1/2" wide by 20" long to cover the entire back of the torso, and two smaller electrodes for the front; for the chest, 9-1/2" wide by 8-1/2" long, and for the abdomen, 10" wide by 8" long. (See illustration on reverse side.)

The electrodes for the chest and abdomen are connected by means of connecting clips, a bifurcated cord, and a bridge composed of squares of block tin alloy. All connections are made after the electrodes are properly placed in position.

These electrodes are all hand made. Immediate delivery can be made upon receipt of order with remittance.

(See Reverse Side for Illustration)

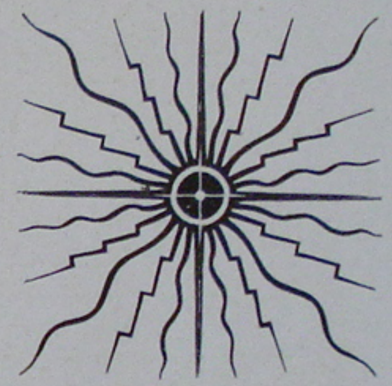
"EURISCO"

Thompson-Plaster
Eye, Ear, Nose and Throat
Combination Cabinet

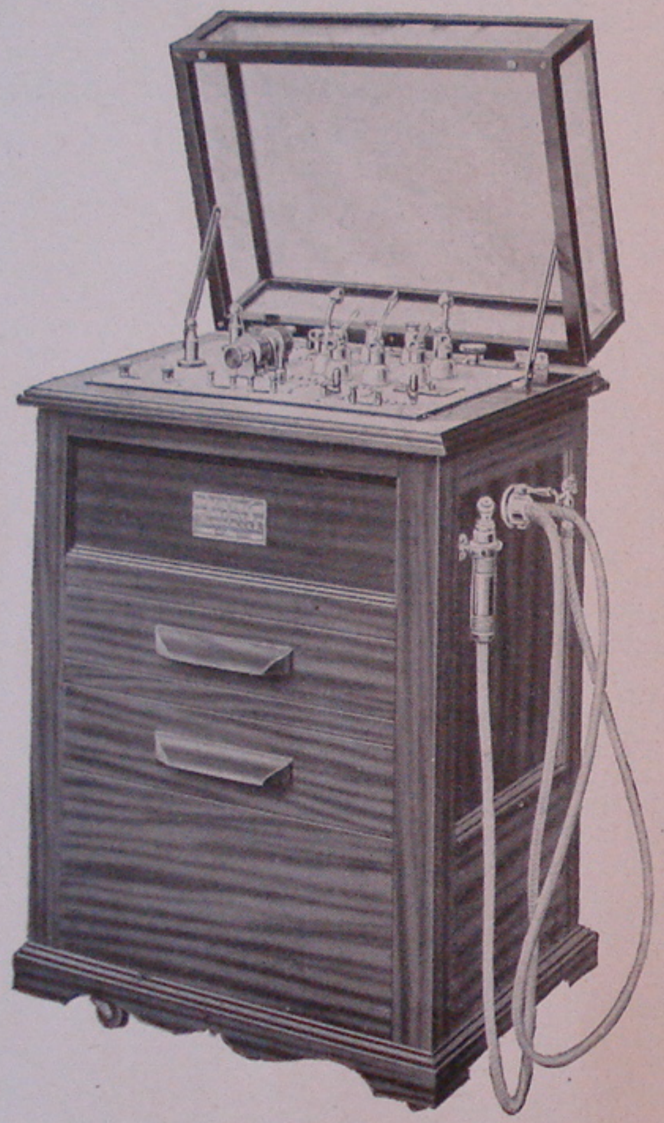
Directions for Installing and Operating

"EURISCO"

The Thompson-Plaster Eye, Ear, Nose and Throat
Combination Cabinet



Thompson & Plaster Co., Inc.
Leesburg, Va. Chicago, Ill.



"EURISCO"

The Thompson-Plaster Eye, Ear, Nose and Throat Combination Cabinet

Installing and Operating Instructions for the

THOMPSON-PLASTER

Eye, Ear, Nose and Throat Combination Outfit.

The unpacking should be done very carefully, with especial attention to the smaller items, to see that none are thrown out with the padding and paper. There are places in the cabinet drawers for practically all of the accessories.

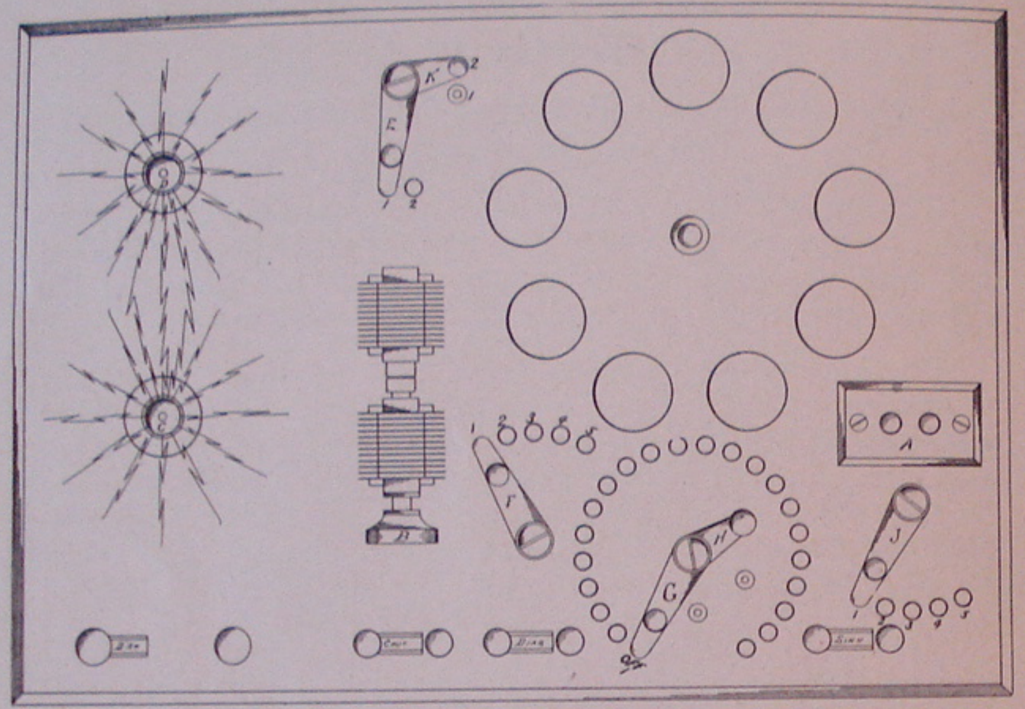
Check each item on the enclosed Packing Slip. Report any shortages at once, *unless not checked* (articles *not checked are not included* with the shipment), and we will give same prompt attention. In case of damages to parts, due to rough handling by the transportation companies, please have their representative go over the outfit with you, and send us a *"Bad Order Receipt"* to enable us to put in proper claim.

The attachment plug on the long black line cord is to be connected to any outlet of 110 Volts, 60 Cycles, Alternating Current. This voltage may vary from 104 to 120 without any appreciable difference in the output of the equipment. The line should be fused for not less than 10 Amperes. If in doubt as to the current available in your office, it is better to consult your local electrician before making connection to line.

* * *

When desiring High Frequency Currents, for use with Glass Vacuum Electrodes, set levers "K," "E," and "J" on point 1, as indicated on drawing of marble plate. The setting of levers "F," "G," and "H" is immaterial when using High Frequency, as they are not connected in this circuit.

Lever "J" is the Rheostat Control, and governs the amount of current entering the machine; point 1 being lowest, and point 5 greatest amount of power.



Lever "E" controls the Condenser, and the speed of the oscillations, or Frequency of discharge will be twice as great on point 1 as on point 2. The *higher the Frequency the smoother will be the current discharge.* The slower the Frequency, the more pronounced will be the sensation of "Electrical Currents" or Sinusoidal, to the patient. The human nervous system can detect oscillations in an electrical current up to approximately 10,000 per second, and, as the *frequency increases,* the *sensation decreases.* The No. 516 Cabinet has a frequency output of *one million per second.*

Lever "K" controls the length of spark; point 1 weakest, and point 2 strongest setting. Have all levers set as indicated on diagram for Fulguration and mild internal High Frequency Treatments. For external massage set controls on points 2 or over, depending on the volume of current desired.

Setting lever "E" on point 1 and "K" on point 2 will permit of a *heavier* flow of current, whereas setting "E" on 2 and "K" on 1 will give a slightly longer spark. Both levers "E" and "K" on 2 will increase both length and heat of discharge. Advancing lever "J" permits more current to enter the transformer, and the output of *all the* modalities will be increased.

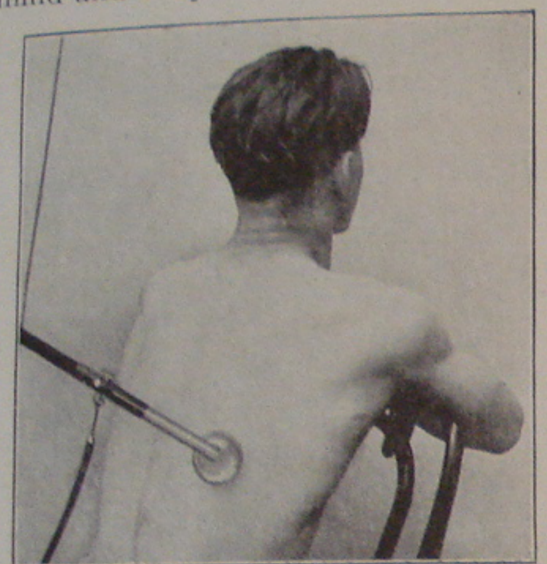
Close spark interrupter points with regulating screw "B," and then open slightly—not over one-sixth of a turn. Connect the heavy black insulated cord on insulated rubber handle to either post "C" or "D." Slip electrode desired in the handle, and *with levers "E," "K," and "J" on points* 1, press Red button on flush switch "A." Regulate strength of current by means of screw "B," or if heavier discharge is desirable, cut off current by pressing Black button on switch "A," advance levers a point or two, and again test current. Always be careful to test the current on yourself first before applying same to your patient, and *be sure to press the Black button on switch "A" when through using outfit.*

By manipulating all three levers you will be able to obtain any desired currents; adjusting Heat, Length and Volume of discharge at will. When the spark interrupter points are closest together the Frequency of the discharge is highest. The wider these points are separated the slower and more powerful will be the impulses, up to a certain point when the voltage of the transformer is not high enough to span the gap, and the discharge will cease altogether.

Never touch any *metal parts* of the outfit when in use. Do not make or break connections with active poles without first cutting off the current at switch "A." Never touch any levers or switches, or attempt to make alterations of settings, with current on, nor when holding an active electrode in the hand; *hold the handle!* Spark points "B," however, may be adjusted with current on.

With a small bit of careful watching you will never shock your patient; but do not forget that a patient once shocked

will be somewhat nervous during subsequent treatments; and, further, the best results are always obtained with the patient's mind and body at ease.



Application of High Frequency

High Frequency Vacuum Tube treatments are indicated generally in Infectious Skin Diseases, and superficial conditions; and Internal Infections that can be reached with electrodes. For this latter work the Insulated Glass Tubes are much to be preferred to the regular variety, (see catalog list in back of booklet), as the current discharge can be located to the desired section.

Always be sure to cut off current with switch "A" when through treating. The pilot light is an indicator to warn the operator when the current is on. Be sure the light is *out* before leaving the cabinet.

FOR D'ARSONVAL AUTO CONDENSATION

Set levers "E" and "K" on points 2. Set lever "J" on point 1. The settings of levers "F," "G" and "H" are immaterial, as they are not connected with the d'Arsonval windings. Have spark points "B" nearly closed, as for High Frequency. (Close them entirely,

and then open about one-sixth turn). After trying the current, and if finding same inadequate, you may increase by advancing lever "J." Point 5 is maximum. Always cut off current at switch "A" before altering positions of any levers.

See that switch "A" is open. Connect heavy maroon cords to posts marked *d'Arsonval.* Fasten one cord to Auto Chair Pad, and other to long nickel plated handle. Have patient sit firmly back against the pad and also hold firmly with both hands to the long handle. Care should be taken that the cords do not touch or even hang near the body at any point. It is well to have the hands supported away from the body so that there will be no danger of sparks passing across; sparks will not only prove annoying, but are apt to burn the patient as well.

Never permit the patient to drop the handle during treatment as a severe burn will result.

The Chair Pad may be used in the reclining position on a table if desired. To obtain the very best and quickest results from the d'Arsonval Treatment, the patient should be made as comfortable as possible, a condition of utter relaxation being ideal, if possible. For that reason, the patient semi-reclining on the pad will derive more benefit than if required to sit up during treatment. Certainly the *position* must depend almost entirely on the *physical condition* of the patient.

Always shut off the current before changing position of patient or control levers, and *never permit* the patient to *drop the handle* with the current *on.*

To regulate strength of current adjust the spark points as for High Frequency. Always remember, that the closer the points are adjusted, one to the other, the higher will be the rate of Frequency or Oscillations, and the smoother the current.

COLOR SCALE MILLI-AMPERE READINGS To ascertain the amount of current being delivered, in milliamperes, by means of the Color Scale sent with the outfit; have current cut off; break connection from machine to metal handle, and fasten disconnected cord to small binding post on end of lamp furnished. The tip on the nickle plated clip should now be fastened into the clamp on end of long handle, and the clip itself snapped over the brass threaded portion of the lamp.

Seat the patient as before, have levers adjusted for mild current, press red button on switch "A," and you will find the lamp glow dimly. Increase by opening spark points "B," and advancing the control levers. While the current is passing through the lamp (in series with the patient), hold the color scale close up and match the color of the lamp to some one of the numbered shades.

As an example: should you desire 500 Milliamperes, and the lamp color matches shade marked 450 or perhaps 525, either increase or decrease output by altering settings of levers "K," "E" and "J," or spark points "B." To increase—open points somewhat and advance lever "J"; to decrease—bring points closer together.

The lamp should be used for testing purposes only and when the desired settings have been obtained should be removed from the circuit, and connections made as before; i. e., direct from the machine to the handle. The resistance of this lamp cuts down the current to the patient about 20% and the operator should figure accordingly.

APPLICATION OF D'ARSONVAL CURRENT The d'Arsonval current as delivered through the chair pad will reduce high arterial pressure. It is necessary to give a number of treatments before any lasting results can be obtained, as although the sphygmomanometer reading before and after treatment will show conclusively that (in most cases at least) the pressure has been lowered, this

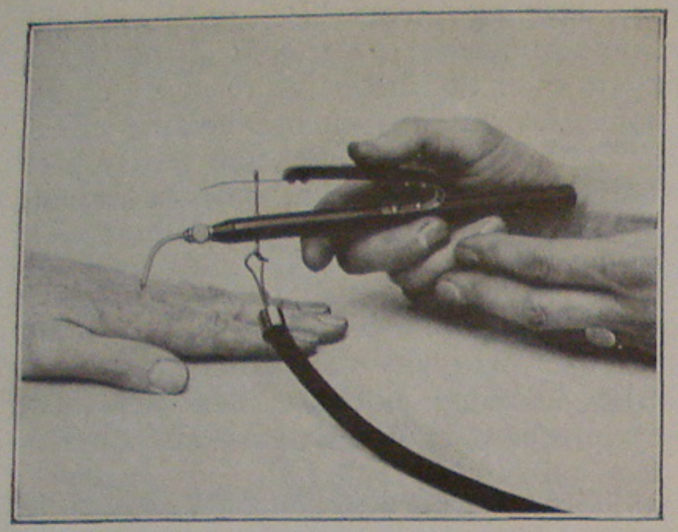
pressure will again go back to the high point, within a short time. Each treatment will serve to reduce the pressure a little more than the previous sitting, and if a lasting result is to be obtained it will be necessary to give several treatments even after the pressure has been reduced to the point desired in order that the pressure will remain down. After the pressure has been brought back to normal it is advisable to taper off on the treatments; that is, decrease the milliampereage slightly at each sitting.

After a few d'Arsonval and High Frequency treatments, the spark points "B" should be cleaned as follows:

TO CLEAN SPARK INTERRUPTER POINTS Generally any irregularity in the discharge of High Frequency or d'Arsonval Currents can be traced to the Spark Interrupter Points "B," as, after using the machine for heavy discharge for any length of time, these points become carbonized, and if this condition is ignored pitting of the silver itself will result.

To clean these points, wet *with saliva* the corner of a card and slide between points, moistening the surfaces; then burn off the moisture with the current. *Have no electrode in the circuit when cleaning points, nor do not have patient connected with Auto-Pad and lamp in circuit.* Repeat the cleaning process two or three times and you will find a considerable quantity of carbon adhering to the card. Work regulating screw "B" back and forth (with the current on) during this process. This will serve to take up most of the foreign matter which may be present in the form of carbon.

Should your points become exceedingly rough at any time, you may have to resort to the "sand paper" method of cleaning. Take a small piece of very fine sand paper and fold same back so that you have a rough surface exposed on both sides. Insert this carefully between the points, close adjusting screw "B" gently, and withdraw the paper. (A nail file works very



Application of Fulguration

To increase the current discharge, do not move levers "K" and "E," but adjust as far as possible, first with points "B," and farther with lever "J." Each time lever "J" is advanced, (*always with current OFF*) be sure that spark points "B" are closely adjusted. As an example: set lever "J" on point 1 and open spark points to deliver maximum current at that setting; cut off current, set lever "J" on 2, all but close points "B," and you will find the current a trifle stronger than when lever "J" was on point 1 and points "B" were wide open. It is a gradual step, and *any* power can be obtained.

It is advisable to use an anesthetic, locally, before applying the Fulguration electrode, as the spark has a hot caustic effect, and really sears its way into the tissues, making the treatment too painful for ordinary cases unless cocaine or some other agent is employed first.

Apply electrode point desired (there are three included with the handle) directly to the part to be treated, and make contact with the spring lever, using index finger or thumb. To alleviate pain as much as possible where sensitive tissues are being encountered, and where no local anesthetic is being used, bring the point to the surface of the skin and quickly remove

it beyond sparking distance; all this with spring lever pressed down. Several short applications like this, of two or three seconds at the most, generally suffice in obtaining the desired result with this method.

When shorter, hotter sparks are desired, set the patient on the chair pad, and instead of connecting the second d'Arsonval wire to the long nickel plated handle, fasten it to the Fulguration electrode; one wire from the d'Arsonval terminals is to be connected to the chair pad, and the other to the Fulguration electrode. Dr. Eberhart has written a thorough chapter on Fulguration Treatments in his latest book, and we take pleasure in referring you to it for complete information of the subject.

CAUTERY See that current is cut off; that spark points "B" are open 1/16 inch; (turn regulating screw to left to open); that levers "G" and "J" are on points 1; that lever "H" is on point marked "C," and that "F" is on point 1. The settings of levers "E" and "K" are immaterial as they are automatically cut out of the circuit when the spark points "B" are separated, and the d'Arsonval and High Frequency currents are also cut off.

Use the heavy maroon cords same as used for d'Arsonval, and clamp tips firmly in posts marked "Cautery," and the other ends to binding posts on end of cautery handle. This handle has a switch for convenience in operating, and pressing the button closes the circuit to the knife.

Press *red button* on switch "A"; repeatedly press switch on cautery handle and advance lever "G," one button at a time until the knife becomes a cherry red color. Do not advance the lever "G" too far and still retain the pressure on the switch on the handle, as there will be danger of burning out the knife.

If a greater degree of heat is desired for very short intervals, you may advance lever "G" a button or two farther, but then be careful to flash the current off and on by means of the cautery handle switch to prevent overheating. If unable to obtain enough heat for heavy knives even with lever "G" on the last or twelfth button, cut off the current entirely, set "G" back to 3 or 4, and advance lever "J." Close the circuit and advance "G" as before until the desired current is obtained. You may advance lever "J" up to point 5 for your heaviest knives.



Proper method of applying Cautery

If you knife does not heat when connected and operated as above, try some other circuit to make sure you have current entering the machine. Look closely at levers "G," "H," "F" and "J" to make sure they are making good contact on the buttons. Your knife itself may even be at fault, the copper bars in which the tip is held possibly being jammed together in packing or shipping.

DIAGNOSTIC Set levers "G," "F" and "J" on points 1, and "H" on contact "D." Separate spark points same as for Cautery. Connect tips of diagnostic lamp cords to posts marked "Diag.", and regulate the brilliancy of the lamp by means of lever "G." If advancing lever "G" clear around does not pass enough current to the lamp, open the circuit and advance lever "J" two or three buttons, and then again start with lever "G" on 1 and increase as desired.

Exercise great care in advancing lever "G" not to go too far when using small lamps, as they burn out easily. Any other lamp for diagnostic purposes may be used in the same manner, the regulation being very fine and the capacity ample. The diagnostic output ranges from 1/2 volt on point 2 to 12 volts on point 16.

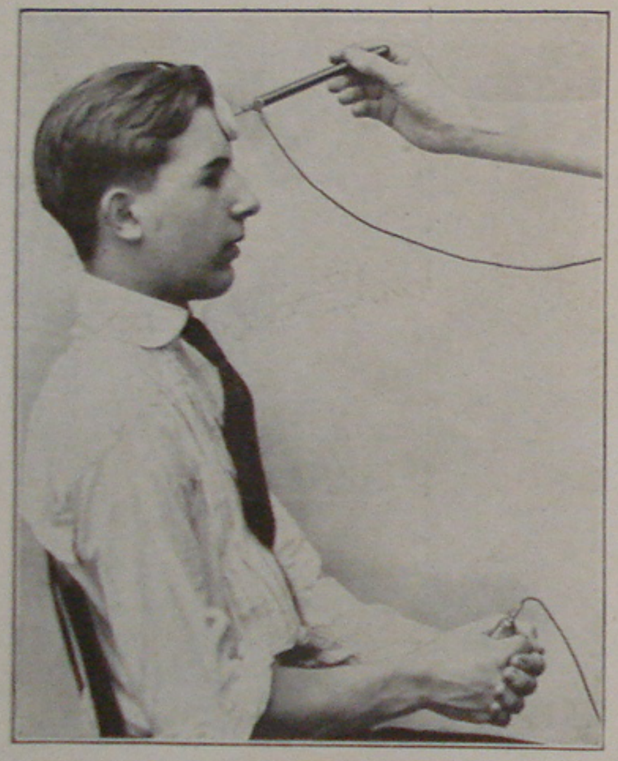


Diagnostic Lamp

When desired, the Cautery and Diagnostic Circuits may be used simultaneously. This is of extreme value when the knife is to be used in a darkened recess. With lever "H" on point "C," adjust heat of cautery knife same as described above, by advancing lever "G" to desired setting. Your lamp will now light up if connected to the diagnostic binding posts, and should the light be insufficient increase volume of current to

the lamp by means of lever "F." Lever "F" will not alter the Cautery circuit.

SINUSOIDAL Have levers "G" and "J" on points 1. Place lever "H" on point "S." Connect short nickel plated handles with the light cords to posts marked "Sinu." Have patient grasp the handles firmly and graduate amount of current to patient by advancing lever "G" same as described under Cautery and Diagnostic. If, after advancing lever "G" all the way around the circle, the current is not sufficient, you may advance lever "J"; try strength of current on each one of the 5 settings, starting with "G" on point 1 each time "J" is advanced one button.

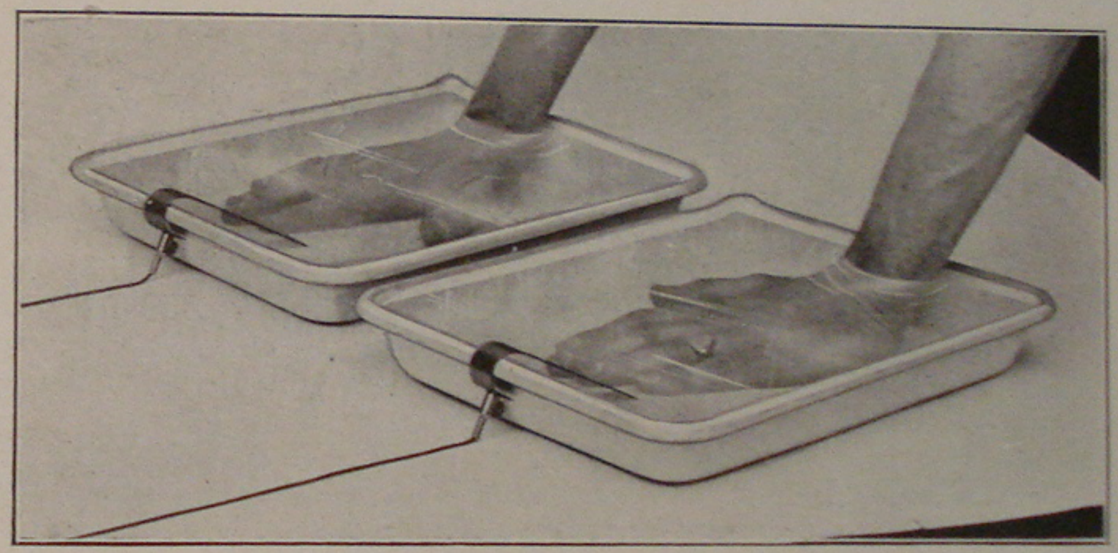


Application of Sinusoidal with Spongio Disc

A moist pad or Spongio Electrode as illustrated, can be used to advantage in many instances where the round handle would be found inconvenient.

The Sinusoidal Current is indicated in all forms of Paralysis or atrophied condition of the muscles or nerves, and in sluggish conditions of the venous blood, as in Varicose Veins, Ulcers, etc.

To obtain the best results in Paralysis of the arms or upper body, immerse the hands in two pans or trays of water, to which has been added a small quantity of salt, connecting one pan to each side of the sinusoidal outlets. Roll small pieces of lead foil around the cord tips before dropping them in the pans, or allow the No. 311 handles to lay directly in the water. The No. 618 Liquid Bath Connectors were especially designed for this purpose. (See catalog section).



Sinusoidal Treatment with pan and water method

The same technic applies to the lower limbs, placing the feet in the trays. If it is desirable to use a stronger current on one limb than on the other, place an extra quantity of salt in the tray where most current is wanted. The action of the salt reduces the electrical resistance of the skin and allows a more free passage of the current.

Sinusoidal current is *contra-indicated* in cases of *high blood pressure*. If your patient has an abnormal blood pressure *always reduce same first* by treating thoroughly with d'Arsonval current. (See pages 6 to 9.)

Periodically interrupted Sinusoidal Current may be obtained by either making and breaking contact at one of the binding posts, or by employing a mechanical interrupter. The price is reasonable.

Don't forget: always moisten the electrodes where possible, before giving treatments with Sinusoidal Current, to overcome the resistance of the skin and insure most current delivered for best results.

* * * * As a resumé on the above, you will find that for Cautery you have 12 *points of regulation*, for Diagnostic 16 *points*, and Sinusoidal 20 *points*. Each of these points is controlled individually by lever "J"; current output with "J" on 5 being considerably stronger than when on point 1. This gives a total of 60 points of regulation for Cautery, 80 for Diagnostic, and 100 for Sinusoidal.

CAUTION Do not advance lever "J" without first cutting off current at switch "A."

Do not permit lever "G" to stop between points.

Do not make or break connections with *red* button on switch "A" pressed down.

Do not expect to obtain Cautery Circuit with lever "H" on "D" or "S," or vice versa.

CORRECTING ERRORS IN OPERATING THE CAUTERY, DIAGNOSTIC AND SINUSOIDAL CIRCUITS

If machine should apparently "go dead," that is, you are unable to obtain any current from it, first unscrew connecting plug of the machine from the illuminating lamp socket, and try the current in same by inserting lamp. If the lamp fails to light, look for burned out fuse in the cut-out box where the current enters your office or building. (Fuses should be of 10 ampere capacity.)

Should your knife still fail to heat when connected to Cautery circuit, test for trouble: Remove Cautery knife from the handle, and set lever "G" on point 6. Complete a short circuit with a knife blade or other piece of metal, across from one post on the handle to the other, and when making and breaking contact observe whether there is any sparking. If no sparks can be seen, you know the trouble is not in the knife, but somewhere nearer the machine. Now disconnect the wires from the handle, and still with lever "G" on point 6, touch the cord tips together, and watch for sparks.

The next step will be on the marble plate itself. You will notice that the small metal plate marked "Cautery" is clamped under one of the binding posts. Throw on your current again and touch the plate with one bar of the Cautery knife, and the opposite post with the other bar of the knife. Should even this fail to indicate the trouble, it should be reported to us at once.

In making these tests, be sure that levers "G" and "H" make good contact on the buttons.

Much the same procedure can be followed with the Diagnostic and Sinusoidal Circuits. When your lamp fails to illuminate, first be sure it is screwed firmly into the socket. Or remove lamp entirely, and after setting lever "H" on point marked "D" and "G" on button 4 or 5, touch side of brass shell on base of lamp to name plate, and end of lamp to opposite post. Try also with metal lamp holder by making a short circuit from post to post, and watch for sparking.

If ever the binding posts appear "dead," with switch "A" closed and tested out as above, report to us at once.

PILOT LIGHT The pilot light indicates a closed circuit to the transformer, and you should always see that this light is out before leaving the machine.

Pilot Light Lamps $0.30 each.

OZONE Dr. Eberhart says "Whenever an electric spark passes through the air ozone is liberated."

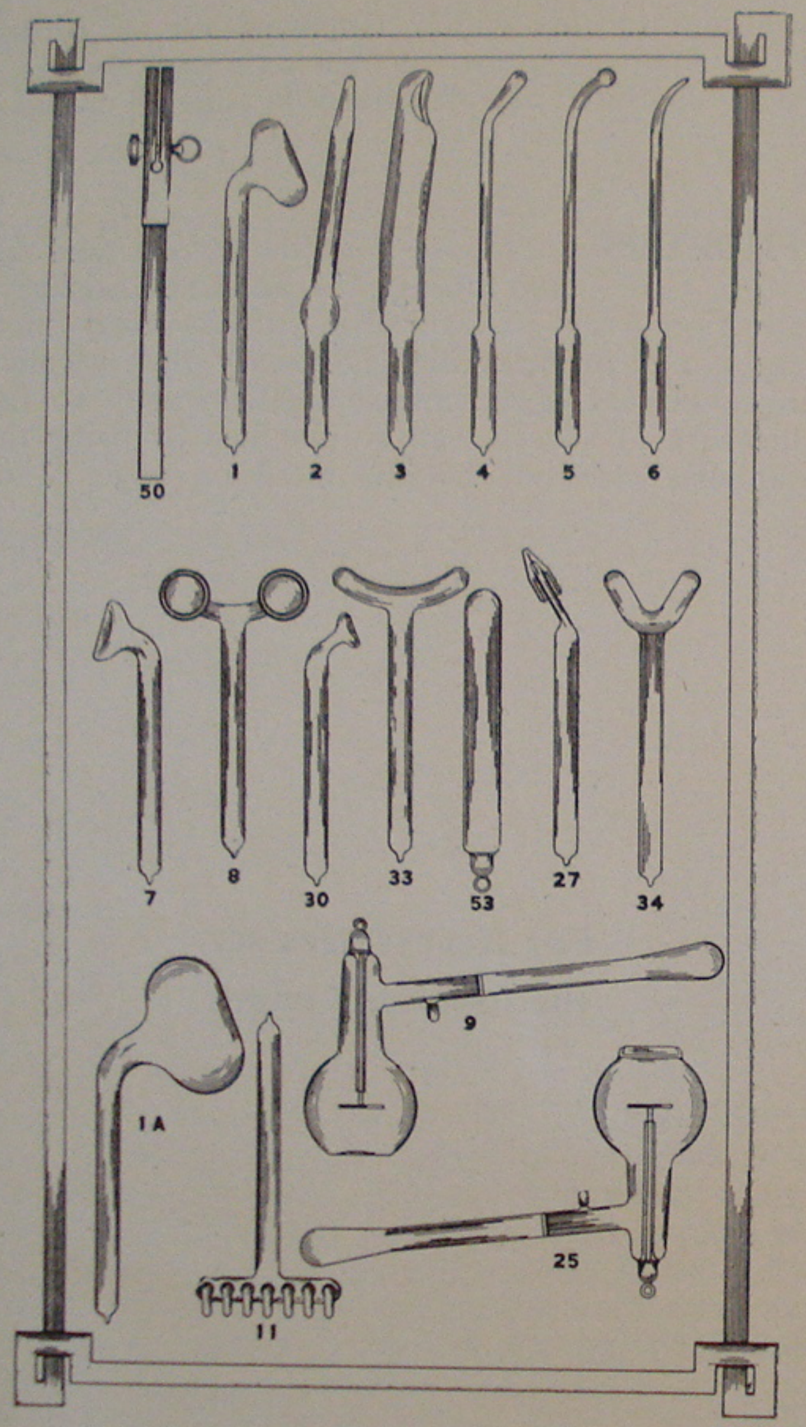
Speaking of ozone Dr. Neiswanger says, "Much of the therapeutic value of electric currents applied to the body depends upon the generation of this agent. All currents produce it in a degree but the greater the frequency and the higher the voltage the greater its production."

One of the many uses of the high frequency current is as a blood purifier through the agency of ozone which is generated by the electric spark or spray and which seeks, with electricity as applied through the high frequency glass vacuum electrode, the path of least resistance which in the body is in the veins as they contain the conductable carbonates and impurities which are mostly in need of this purifying action of ozone.

In addition to this widely employed use of ozone is a method of employing it for inhalation through the use of an ozonizer as illustrated and described on page 28 of this booklet.

CATAPHORESIS Cataphoresis is the introduction of medicine through the unbroken skin by means of an electric current and for this purpose many successful physicians use an ordinary high frequency glass vacuum electrode in connection with suitable medicine but no doubt a larger measure of success can be obtained by using the special cataphoric electrode as illustrated on page 22 of this booklet.

For Accessories see the following pages

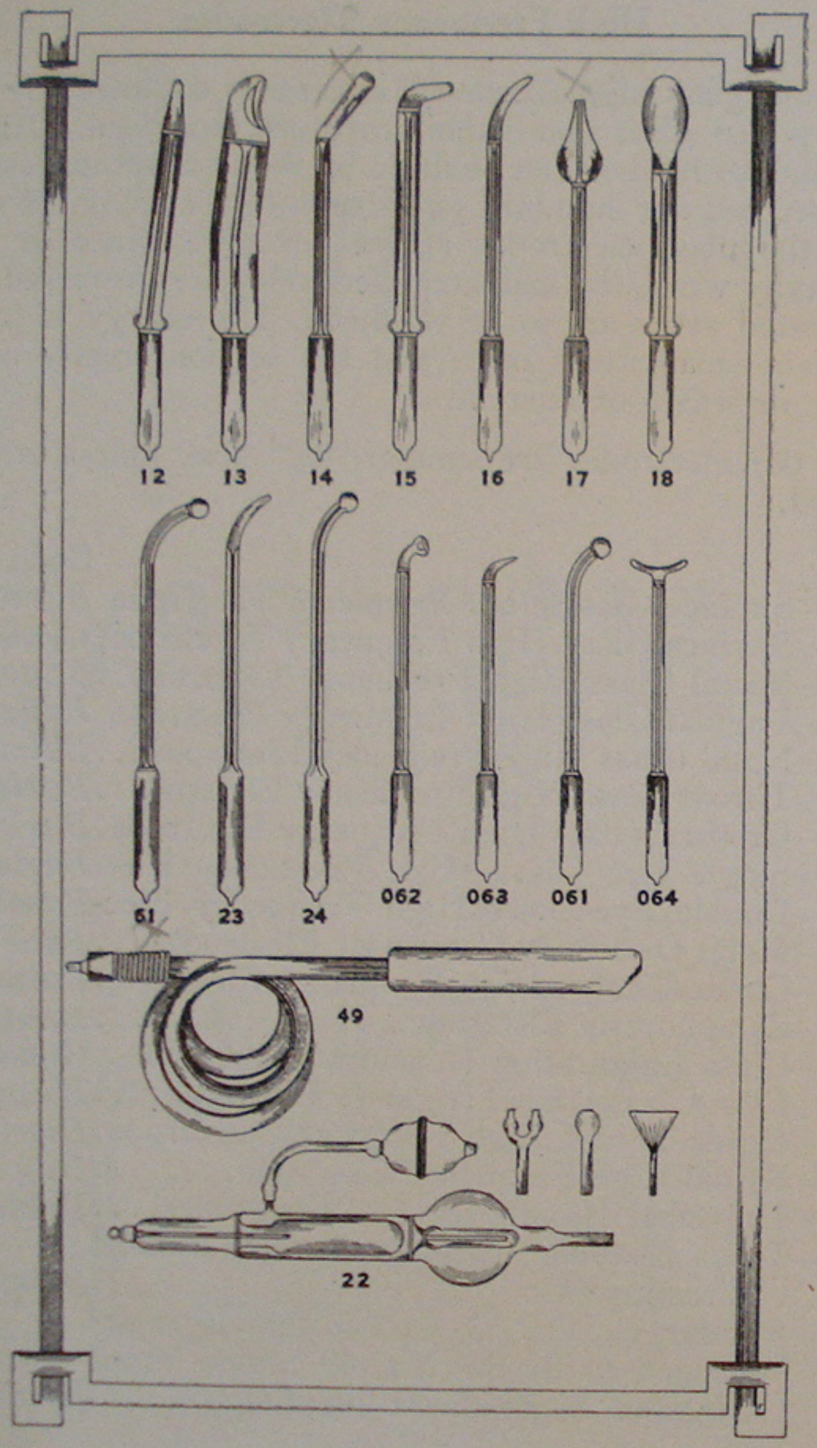


High Frequency Electrodes

All our glass high frequency electrodes are made by us, of the very best glass obtainable; carefully annealed. All sizes and makes of holders can be fitted on request, but unless otherwise specified our standard ⅝″ size is furnished on all orders. While the plain electrodes suffice for all surface or superficial cavity work, the insulated electrodes are preferred where deep seated areas are to be reached. The energy is confined to certain small areas only, and the section treated without leakage or waste of current.

All our electrodes are standard ⅝″ size, unless otherwise specified.

No.		Code	Price
1	—Surface Glass High Frequency Electrode.	*Bacca*	$0.75
1A	—Surface Glass High Frequency Electrode.	***Gram***	**1.00**
2	—Rectal Glass High Frequency Electrode..	*Bagot*	.85
3	—Vaginal Glass High Frequency Electrode.	*Ballet*	.75
4	—Nasal Glass High Frequency Electrode...	*Balm*	.75
5	—Throat Glass High Frequency Electrode..	*Baric*	.75
6	—Urethral Glass High Frequency Electrode.	*Bark*	.75
7	—Single Eye Glass High Frequency Elec-	*Barley*	.75
8	—Double Eye Glass High Frequency Elec-	*Basal*	1.00
9	—Metal Disc Body Condenser Electrode....	*Basic*	3.50
11	—Comb (Scalp) High Frequency Electrode.	*Batia*	2.00
25	—Cataphoresis Electrode.....	***Binder***	**4.00**
27	—Glass Fulguration (Vacuum) Electrode..	*Guad*	1.50
30	—Corn Glass High Frequency Electrode....	*Biogen*	.75
33	—Outer Throat High Frequency Electrode.	*Biotic*	.75
34	—Spinal High Frequency Electrode.....	*Bite*	.75
50	—Universal Handle for ⅝″ Electrodes....	*Bolus*	1.00
53	—Glass Handle (Vacuum) for Indirect Treatments.....	*Bismal*	1.00
54	—Similar to No. 53, except that it is arranged to fit the No. 49 Shock Proof Handle. For indirect Treating.....	*Banter*	.75

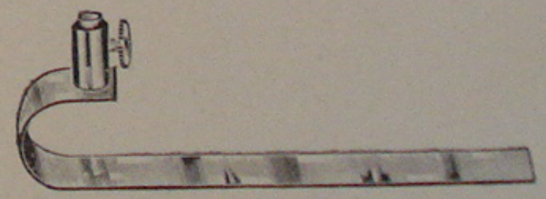


High Frequency Electrodes—Continued

No.		Code	Price
12	Rectal Insulated Glass Electrode	*Bazin*	$1.50
13	Vaginal Insulated Glass Electrode	*Beat*	1.75
14	Nasal Insulated Glass Electrode	*Bed*	1.50
15	Post Nasal Insulated Glass Electrode	*Beef*	1.50
16	Urethral Insulated Glass Electrode	*Bela*	1.50
17	Inner Ear Insulated Glass Electrode	*Belt*	1.50
18	Tongue Insulated Glass Electrode	*Benzol*	1.50
22	Ozone Generator—Complete	*Bidwy*	10.00
23	Heavy Glass Special Urethral Electrode	*Gull*	1.00
24	Heavy Glass Special Throat Electrode	*Gum*	1.00
49	Insulated Handle and Cord for 5/8″ Elect.	*Block*	3.50
61	Insulated Throat Electrode	*Breath*	1.50
	Complete set of Snow's Electrodes, Nos. 1. 2, 3, 4, 5 and 6		3.50
609	Diathermy Disc, 3″ Diameter	*Graft*	0.75
606R	Rubber Handle for Diathermy Discs	*Jecur*	1.00

Insulated Shock Proof Handle for High Frequency Electrodes

Many operators complain of the danger of shocking either themselves or their patients with our regular No. 50 Handle, on account of the exposed metal connection. We therefore designed the special Insulated Handle, No. 49 (see illustration on page 24), which has no exposed contacts and is absolutely shock proof. Made entirely of one piece of hard rubber, with the heavy insulated connecting cord fastened securely to the spring brass clamp inside. No. 49 Handle and Cord, Price $3.50.



No. 618 Liquid Bath Connector described on page 17 *Price $0.50*

Fulguration Electrode No. 20

Fulguration is the best known method of applying the High Frequency Current for the removal of Warts, Moles, Nevi and similar growths. When used in connection with this outfit, most excellent results can be obtained in the removal of Neoplasms of the Urinary Bladder, and for the destruction of Cancerous Masses. Our No. 20 Electrode is supplied with three tips of different shapes for all surface work, and specially prepared Rubber Covered Steel Wire for introduction through urethral Catheters or Cystoscopes will be furnished if desired.

No.		Code	Price
20	—Fulguration Electrode, with 3 tips	*Gadol*	$2.00
40	—Fulguration Wire, Rubber Covered	*Gag*	25c ft.

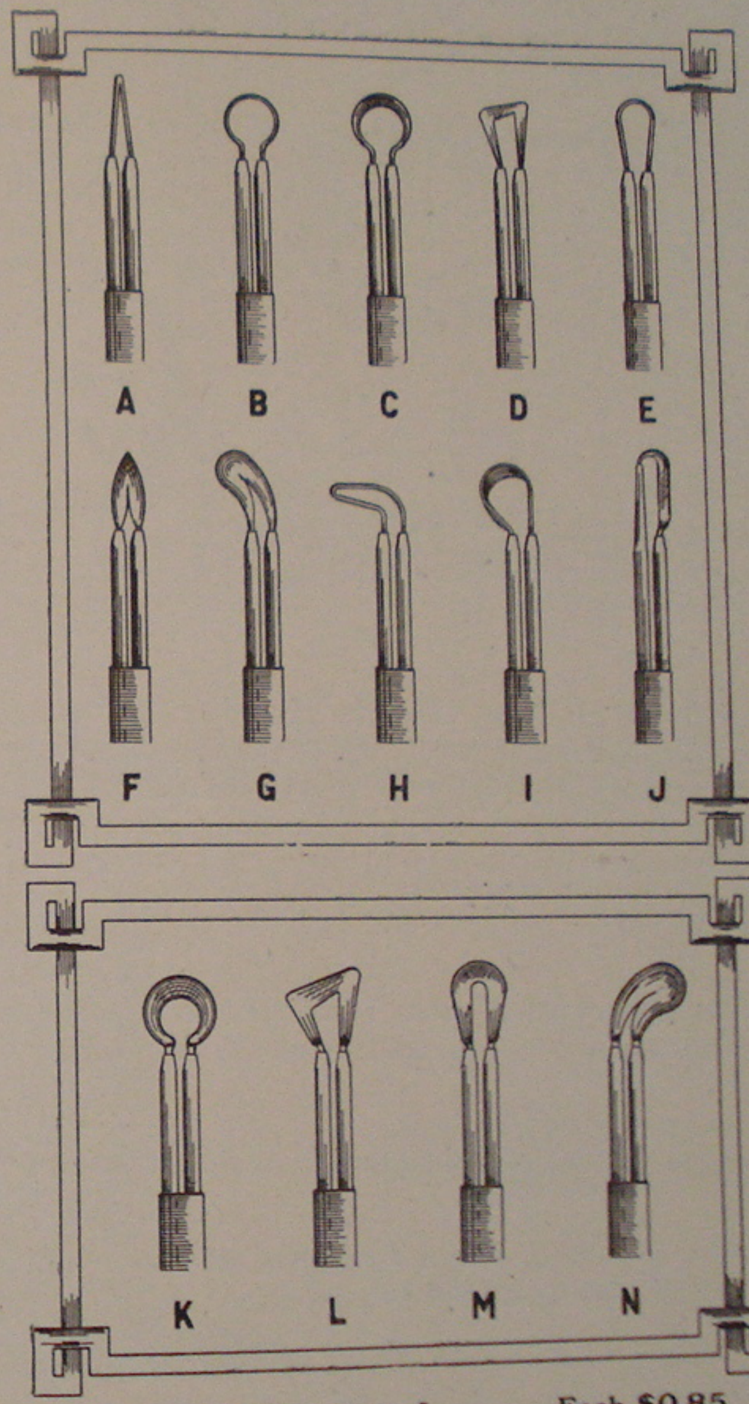
(Illustrations on page 30)

No. 51—Heavy Insulated High Frequency Cord

This cord is made of a stranded Copper conductor covered with several layers of pure Gum Rubber. It is perfectly safe to touch any part of this cord even when passing considerable current, as the Rubber covering is heavy enough to afford ample protection. Cord is very flexible.

At one end is mounted our standard cord tip, which will fit into any of our machines; on the other end is fastened a special spring clasp.

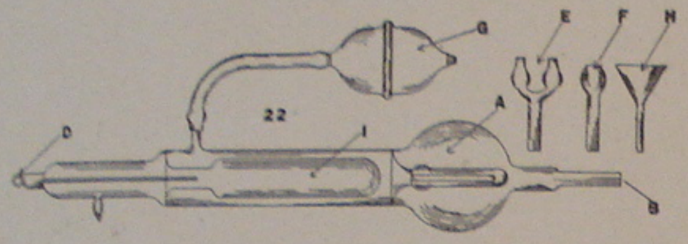
No.		Code	Price
51	—Heavy Cord, 4 ft. long	*Gait*	$1.00
51-5	—Heavy Cord, 5 ft. long	*Hirtz*	1.20
51-6	—Heavy Cord, 6 ft. long	*Hoche*	1.35
51-7	—Heavy Cord, 7 ft. long	*Hodge*	1.50



Cautery Knives, A to J — **Each $0.85**
Cautery Knives, K to N — **" 1.10**

Ozone Generator No. 22

An *all glass* Ozonizer, made in one piece. Has two compartments, one for holding the purifying oils (we furnish an ounce each of Oil of Eucalyptus and Oil of Pine Needles with the electrode), and a Vacuum chamber to which is connected the wire from the High Frequency Current.

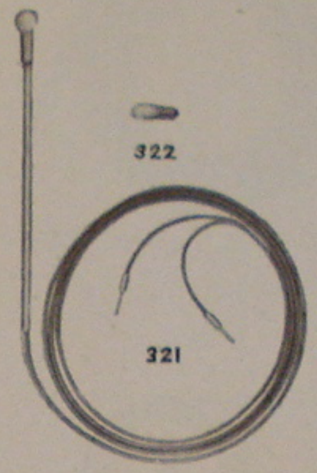


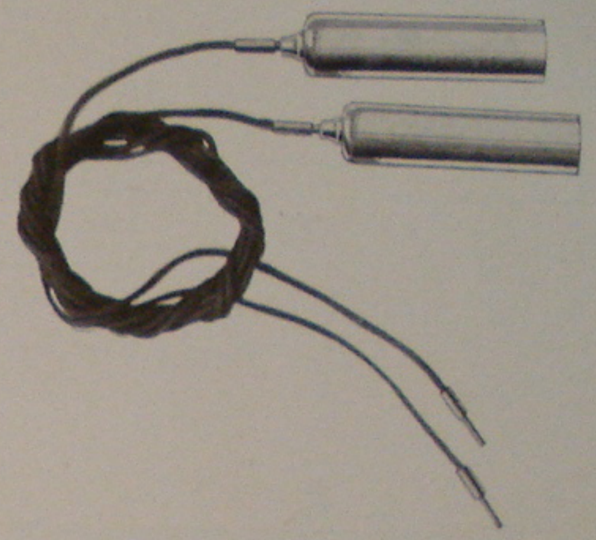
Connection is made at "D," the chamber "A" partly filled with the neutralizing oils, and the generator grasped firmly at "I." The current passes from the active Electrode "I" through the air space to the hand, filling the outer chamber with pure ozone. Nose piece "E" or mouth piece "F" is connected with rubber tubing to end "B." Air is gently forced through by means of bulb "G."

The ozone impregnated vapor is inhaled by the patient, and is an excellent aid in treating diseases of the respiratory organs.

No.	Code	Price
22—Ozone Generator, complete as illustrated...	*Bidwy*	$10.00

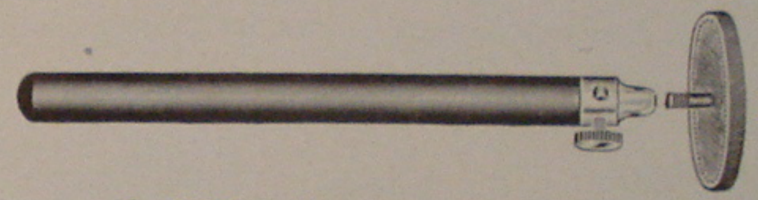
The ozone generator is not furnished with the cabinet, but is an extra that may be added to equipment if desired at price specified above.





No. 322 Lamp, Price $0.50
No. 321 Handle & Cords $1.15
Complete $1.60

No. 311 Metal Treatment Handles $0.40
No. 312 Treatment Cords $0.50



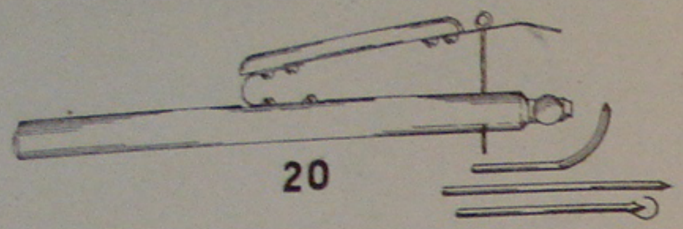
No. 316 Felt Pad Electrode and Handle $0 50



No. 410 Chair Pad $10.00



No. 52
Auto Condensation Handle $0.75

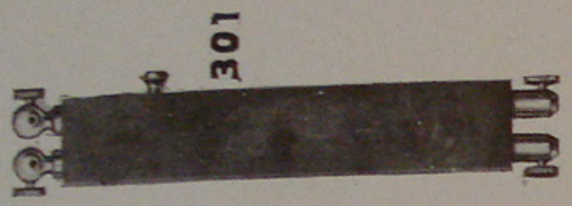


No. 20 Fulguration Electrode $2.00

Described on page 26



No. 51 H. F. Cord $1.00



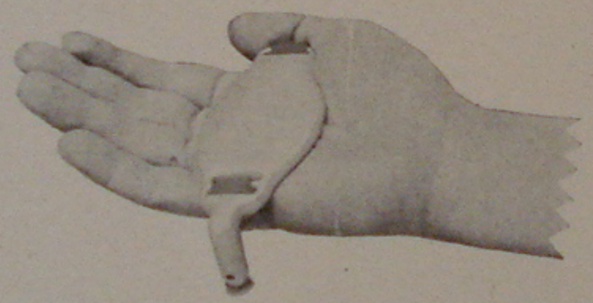
No. 301 Cautery Handle $1.75



No. 306 Cautery Cords $1.00



No. 609
3" Diathermy Disc $0.75





No. 606R Rubber Handle $1.00



No. 614 Diathermy Hand Electrode $1.25

A BRIEF RESUME

of

DIATHERMY

Prepared for:

F.J.Moenninghoff M.D.
Monett, Missouri

I. MEDICAL DIATHERMY:

A. Diathermy means "to heat through"; and is secured by passing high frequency currents through tissues; the heat effect is due to the natural resistance of the tissues to the passage of the current; the frequency of the current being so high does not elicit neuro-muscular response.

B. Affects;

1. Tissues are heated uniformally throughout the part being treated, within their physiological limits.
2. A controled hyperemia is produced.
3. Tissues are bathed by an increased blood supply.
4. Phagocytosis is augmented.
5. Stasis is broken up.
6. Toxind and traumatic exudates absorbed and removed via increased venous drainage.
7. Blood-cell forming mechanism is benefitted.
8. A sedative action due to the removal of neuro-toxins.

C. Contra-Indications;

1. Walled off pus.
2. Recent hemorrhage.
3. Through the female pelvis 36 hours before or after menstruation.
4. Through the pelvis during any stage of pregnancy.
5. During the soft callous forming stage of healing fractures.

D. Technic; Methods of application;

1. Plate & Plate Method: the part to be treated is sandwiched between two electrodes; if heating effect is desired nearer one surface than the other, then the electrode on that surface must be the smaller of the two. (Most desirable Method) .

2. Plate & Cuff Method: as, the hand rests on one electrode and a cuff is placed around the fore-arm.

3. Water & Cuff Method: as, the hand is placed is a glass or earthenware vessel and covered at least one inch with salt solution, and a cuff is placed on the fore-arm.

4. Cuff & Cuff Method: as, one cuff is placed above the knee or mid-thigh, and the other cuff is placed below about the middle of the leg.

E. Preparation of electrodes;

1. Smooth block-tin electrodes on a perfectly flat surface.
2. Remove all sharp corners and wrinkles from electrodes.
3. Apply contact-medium to both electrode and surface of contact.

NOTE: Contact Medium;
Sodium chloride ..... drams 1.
Glycerine q.s. ..... ounces 4
Sig: Warm solution slightly to dissolve salt; allow undissolved salt to settle out; add glycerine (as used) until salt supply is exhausted.

4. Hold electrodes and cord-tip attachments securely in position with sand-bags or elastic bandages. Keep elastic bandages clean and free of contact medium.

F. Administration of treatment;

1. Completely close spark-gap; intensity control on lowest setting.
2. Turn on main switch and gradually advance intensity by opening spark-gap. Advance in first minute about one-third of maximum intensity of spark-gap. (Maximum intensity of spark-gap is about one-sixteenth of an inch). After two minutes advance another third. And after two more minutes advance the other third.
3. In the next five to ten minutes advance spark-gap and intensity-control to maximum for the treatment.

Note: The maximum dose in most cases can be determined by the patient's tolerance. When this is not to be relied upon a safe limit of 60 M.A. per square-inch can used as a guide.

4. Allow maximum dose to run for ten to twenty minutes; interrupting when necessary for manipulation, massage or adjustment of electrodes.
5. Retard intensity slowly (five to ten minutes), completely closing spark-gap and turn main switch in OFF position before disconnecting patient.

II. SURGICAL DIATHERMY:

A. Surgical diathermy is secured by passing high frequency currents through tissues, heating them beyond their physiological limits, producing actual tissue destruction, either by dehydration or coagulation.

B. Affects;

1. The rapid effective destruction of abnormal growths.
2. Blood and lymph channels are sealed, preventing subsequent metastasis or hemorrhage.
3. Sterilization of wound.
4. A good cosmetic effect.
5. Divided nerve fibers are sealed over in such a way as to render them less sensitive; less shock and less pain during the postoperative and convalescent periods.

C. Cautions;

1. Danger of explosion of anesthetics and highly combustable cleaning agents used in or about the lesion treated.
2. Danger of explosion of ligated blood vessels in and around the lesion treated.
3. Healing is slower than scalpel surgery; sutures and skin-clips must be left in place from two to six days longer.
4. Adequate drainage provided for increased serous drainage.
5. Metal instruments lying on the skin adjacent to the area treated must be insulated from the skin.

D. Technic;

1. The extent of destruction is determined by the size and depth of the lesion.
2. For superficial lesions a mono-polar current of light or mild intensity, with actual sparking to the lesion from the electrode.
3. For lesions involving more than the upper layers of the skin a mono-polar current of moderate intensity, in contact with lesion; the terminal point of the treatment is indicated by a blanched border of the lesion. Slough follows this treatment.
4. For more extensive lesions, where deeper destruction is required a bi-polar current of moderate intensity, buried within the lesion; terminal point is carbonization; curretment of such is advisable.

A BRIEF RESUME

of

LIGHT THERAPY

Prepared for:

F.J.Moenninghoff M.D.
Monett, Missouri.

Spectrum analysis of light energy; THE SPECTRUM,

INFRA-RED		VISIBLE LIGHT							ULTRA-VIOLET	
Far	Near	R	O	Y	G	B	I	V	Near	Far
(Element)	(Bulb)	(Carbon - Arc)							(General)	(Local)
HEAT		Under research							CHEMICAL (Catalyst)	

MERCURY QUARTZ ULTRA - VIOLET LIGHT:

I. ALPINE:: Air-cooled Ultra-Violet light: GENERAL APPLICATION

A. Affects;

1. Essentially a metabolic stimulant.
2. Indirectly bactericidal.
3. Enhances glandular activity.
4. Aids calcium fixation.
5. Restores acid-alkaline balance.
6. Restores oxygen-carbon dioxide balance.
7. Increases R.B.C. and W.B.C. (only temporarily).

B. Contra-indications;

1. Extreme toxic conditions (See fractional dosage).
2. Drugs;
   a). Quinine sulfate.
   b). Analine dyes and their derivatives.
   c). The heavy metals.
3. Diabetes (Treat with caution).

C. Cautions:

1. Protect the eyes (black paper shades or oil).
2. " " nipples (Only).
3. " " umbilicus (When protruding).
4. " " scars (When elevated).
5. Use only dark (black) treatment-table covers and pillow-slips. Avoid anything that would reflect rays.

D. Technic; Tonic Ultra-Violet:

1. Preceed each treatment (2 to 6 hours) by a soap and water bath.
2. A course of treatments consists of 12 to 16 treatments.
3. The entire body (in the anatomical position) is to be radiated; front and back.
4. Use sub-erythema dose (see Calibration Chart) . Avoid tanning.
5. Treatments are given on alternate days. Never super-impose a new reaction on an old one.
6. An increase water in-put is advisible during course of treatments.
7. Increase each treatment by one minute; front and back.

E. Sub-Erythema Dose; CALIBRATION CHART

COMPLEXION	TIME	DISTANCE
Light	1 MIN.	30 INCH
Average	2 MIN.	30 "
Dark	3 MIN.	30 "
Very dark	5 MIN.	30 "

* Rule; To double the intensity, half the distance.

(January 22, 1940.)

F. Fractional Dose; Used in extreme toxic conditions:

1. The sub-erythema dose is used (See Calibration Chart).
2. Treatments are given on alternate days.
3. First treatment - feet to knees - front only.
4. Second " - feet to knees - front and back.
5. Third " - feet to hips - front only.
6. Fourth " - feet to hips - front and back.
7. Fifth " - anatomical position - front only.
8. Sixth " - " " - back only.
9. Seventh " - " " - front and back.
10. Eighth " - increase by one minute and continue as Tonic Ultra-Violet Light.

II. KROMAYER: Water-cooled Ultra-Violet Light: LOCAL APPLICATION

A. Contra-Indications;

There are no contro-indications to local ultra-violet light.

B. Affects;

Degree erythema	Appearance of reaction	Action
First	Mild blush	Essentially a metabolic stimulant.
Second	Reddening	Bactericidal and granulating.
Third	Intense reddening	Exfoliating.
Fourth	Blistering	Epilating.

C. Cautions;

1. Limit the area to be reacted.
2. Thoroughly cleanse area by removing crusts, scabs, secretions and exudates. A fifty oper-cent alcohol solution is advisible.
3. Avoid the use of greasy or oily dressings.
4. Always react at least one-quarter of an inch of the border of an open lesion.
5. Avoid a tight dressing following reaction.

D. CALIBRATION CHART:

Degree erythema	Time of appearance	Duration	Distance	Time
First	2 hours	6 hours	2 INCH	7 SEC.
Second	1 hour	12 hours	2 "	15 SEC.
Third	½ hour	3 days	2 "	30 SEC.
Fourth	¼ hour	1 week	2 "	45 SEC.

(January 22, 1940)

E. Applicators;

1. Thoroughly cleanse quartz-window and quartz-applicator with alcohol.
2. For contact treatment on skin, reduce exposure time two-thirds.
3. For contact treatment on mucus membranes, reduce exposure time by one-half.

CATALOG OF

ELECTRO-SURGICAL · MEDICAL EQUIPMENT

H. G. Fischer & Co. Chicago, Ill.

NUMBER 36 1939-40

ACCESSORIES and SUPPLIES

H. G. FISCHER & CO.

Manufacturers of

X-RAY AND ELECTRO-SURGICAL-MEDICAL EQUIPMENT

2323-2345 Wabansia Avenue · Chicago Illinois

FISCHER ELECTRO-SURGICAL-MEDICAL EQUIPMENT, X-RAY APPARATUS ACCESSORIES and SUPPLIES

1939-1940 · Catalog No. 36

H. G. FISCHER & CO.
2323-2345 Wabansia Avenue · Chicago, Illinois



Home of H. G. FISCHER & CO. :: 2323-2345 Wabansia Ave., CHICAGO, ILLINOIS

The Complete FISCHER Line

THE complete FISCHER Line includes X-ray Apparatus (Medical and Dental), Short Wave High Frequency Units, Combination Cabinets, Galvanic Apparatus and Wave Generators, Diathermy Machines, Tissue-cutting Units, Ultra-violet and Infra-red Generators, Accessories and Supplies. The FISCHER manufacturing policy requires first that every piece of FISCHER equipment shall equal or exceed in performance every competing unit designed for the same purpose, regardless of price. Second, the unit itself must be priced at the lowest point consistent with quality manufacture.

Since 1910, H. G. FISCHER & CO. have been one of the largest manufacturers of x-ray and electro-surgical-medical apparatus. Their equipment is known today and used the world around. It is a fact worth noting that this company was founded so long ago with small capital, and has been built up to its present proportions without the introduction of outside capital, never undertaking any mergers or reorganizations. We believe this is the only company in the industry where the men who founded it have always been and still are the active heads—where the original ideals of building the most efficient, durable and result-producing equipment possible and selling it at a fair price have been continued through the company's history with the same continuity of ownership, management and personnel.

The fact that more than 65,000 physicians, dentists, hospitals, clinics and universities in the United States and throughout the world use FISCHER manufactured equipment and that virtually all of these over this period have purchased additional FISCHER equipment is evidence that this apparatus can be thoroughly relied upon.

Further, the fact that H. G. FISCHER & CO. distributes its products through its own factory-trained dealer representatives not only enables the purchaser to get a great deal more per dollar expended by way of efficient and durable equipment, but at the same time assures to him an extraordinary high quality of service from expert men. Our comparatively small overhead expense and direct factory representation enable us to give the purchaser such value per dollar expended as cannot be excelled by any competitor in the field.

The FISCHER plant is centrally located. Physicians or dentists visiting Chicago are invited to spend as much time as they desire inspecting our newest apparatus or consulting regarding the technics of application. Factory visitors are not solicited for orders. When wanting information, ask your local FISCHER dealer representative or write to our Home Office in Chicago.

FOREWORD

In presenting this 36th Edition of the H. G. FISCHER & CO. Catalog of Electro-Surgical-Medical-Equipment, X-Ray Apparatus, Accessories and Supplies, it is pertinent to note:

. . . 1 That every effort has been made to include all apparatus and accessories needed by the physician for the application of electro-therapeutic technics.

. . . 2 That often competing items are shown, including apparatus, accessories and supplies, permitting selections to be made.

. . . 3 That prices have been inserted for the convenience of customers, although from time to time changes in prices are necessary.

. . 4 That a handy reference index will be found at the back of this catalog.

Every piece of apparatus, also all accessories and supplies listed are recommended as high quality and thoroughly dependable. It is to be understood, further, that illustrations and descriptions are not binding as to detail, in view of the fact that improvements are constantly being sought and, when found, adopted by the manufacturers.

Orders will always be filled with "the latest model" equipment, accessories, or supplies—new models naturally being superior to the models replaced.

Requests for items not catalogued are invited.

NOTICE

Prices quoted are subject to change without notice. H. G. FISCHER & CO. makes every effort to give prompt and efficient service. Read page 43 for Instructions on How to Order.

FISCHER Model "M" Short Wave Apparatus

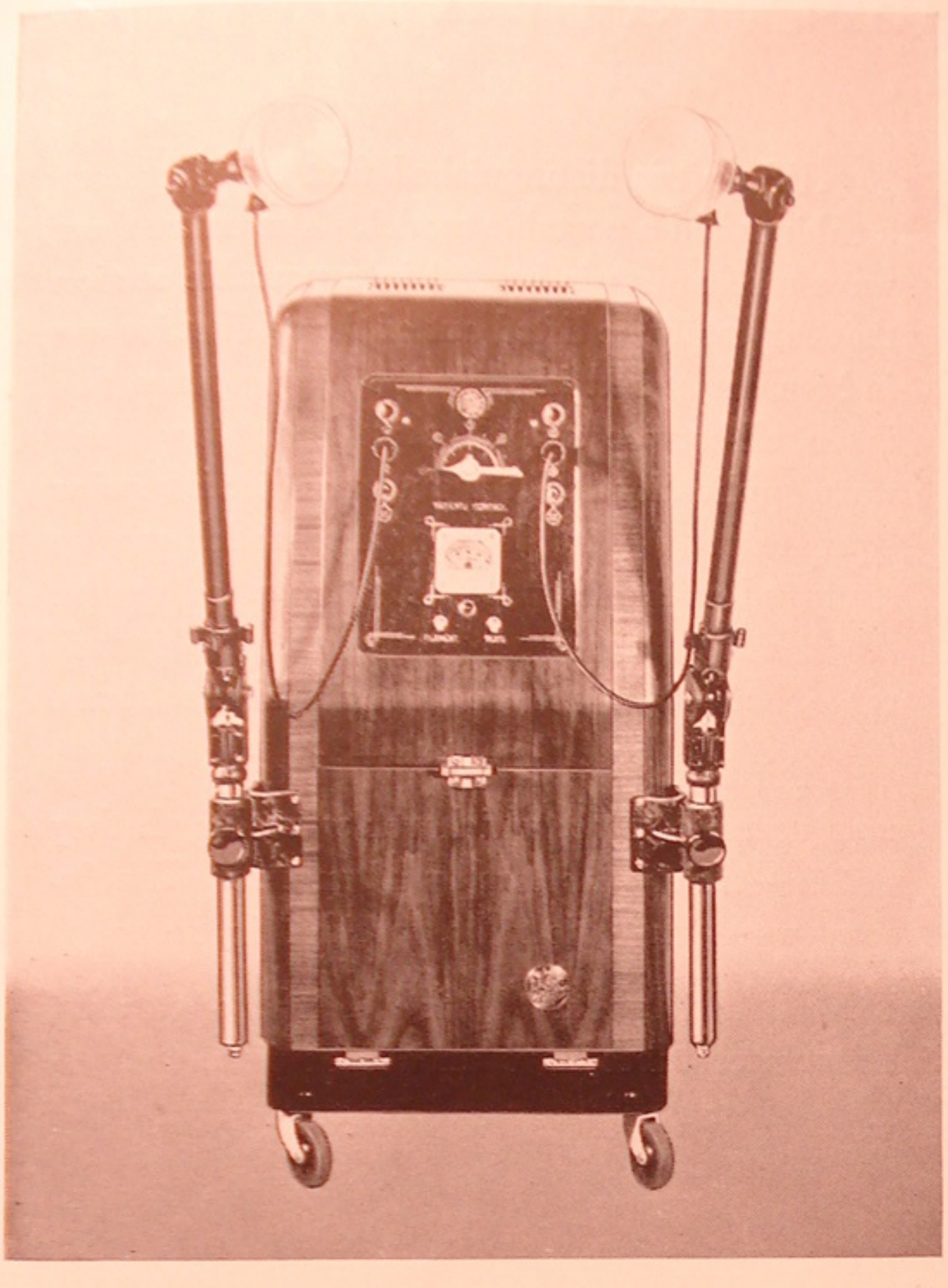


THIS unit is recommended to physicians, hospitals, clinics, medical schools, wanting finest performance in all short wave facilities. Among important features are the following: (1) The inductance dise with universally flexible arm is standard equipment. Performance of this dise is so effective that it gives virtually every service needed in short wave therapy. (2) Unit permits applications to be made with either inductance cable, cuff, pad, or orificial electrodes, when indications require such applications. (3) Users who wish it may have this apparatus equipped with air-spaced electrodes. These are generally used in pairs, but fit the FISCHER universally flexible arm, thus requiring only one additional flexible arm. This Model "M" provides all short wave applications, including excellent electrosurgical currents. A complete list of features of structure-operation is given on the following page.

Control Panel

VIEW RIGHT: This enlarged panel of FISCHER Model "M" Short Wave Apparatus shows complete markings—the six patient's outlets, the single control, the milliammeter, and filament and plate switches. The simplicity of control and ease of operation are features deserving special emphasis. The control itself has the advantage of providing both coarse or rapid and fine adjustment, the latter being vernier adjustment. Currents, for any purpose, are under very fine control—and power can be applied to the patient at any level up to the full output of the apparatus. Fine control applies also to the electrosurgical currents.





Short Wave Therapy

As a therapeutic agent, short wave diathermy has today won such distinction as to deserve a place in every physician's office. Authorities, who have had extensive experience with short wave applications and results, say that short wave diathermy is perhaps the most important contribution to medical practice since Roentgen's epochal discovery of the x-ray. As a modality for creating heat within body tissues, short wave diathermy is unequalled in convenience and effectiveness. Deep heating or localized heating are equally possible. Application means simply to bring the part to be heated within the electrical field. It is fair to say that with short wave diathermy you can put as much heat as you want, anywhere you want it.

Features of Structure-Operation

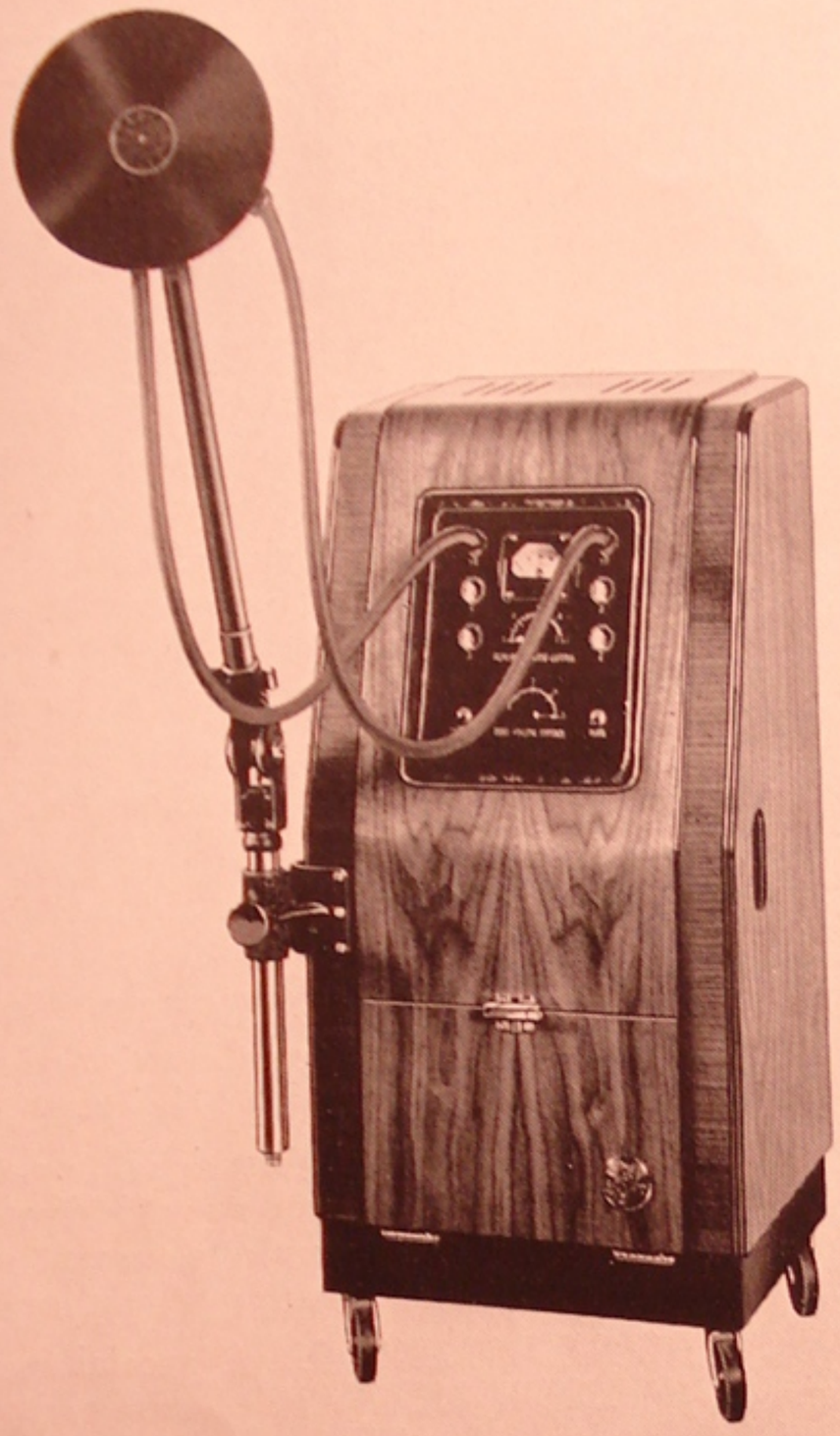
1. POWER. Photometric tests show the power of FISCHER Model "M" to be unusually great—at least 25% over former apparatus.
2. FLEXIBILITY OF APPLICATIONS. All types of short wave applications are possible—inductance disc, inductance cable, condenser cuff, pad or orificial electrodes and air-spaced electrodes.
3. DEPENDABILITY OF PERFORMANCE. FISCHER Model "M" Short Wave Apparatus is designed and constructed to give long years of efficient trouble-free service.
4. SINGLE CONTROL. Simplicity of control and fineness of control are features. Power can be applied to patients at any level up to maximum.
5. TUBES. FISCHER Model "M" is a four tube unit—2 power, 2 rectifier. They are especially efficient and durable. Tantalum anodes instead of carbon.
6. PATIENTS' OUTLETS. There are six patients' outlets—four for condenser electrodes and two for the inductance cable or inductance disc.
7. HIGHEST QUALITY CONSTRUCTION. The very finest materials are used. The cabinet is walnut, built like finest furniture. The panel is bakelite.
8. VENTILATION. Provided by the double ventilator at top of cabinet. The air passes upward directly over the tubes and ventilation is ample to prevent overheating of tubes, regardless of duration of application.
9. TUBE CIRCUIT BALANCED. A special method of wiring in FISCHER Model "M" forces each tube to carry its proper load. The result is protection and longer life for the tubes.
10. ELECTROSURGICAL CURRENTS. Currents for electrocoagulation and for electrosurgical tissue cutting merit special mention. They are much superior to such currents in previous models. Tissue cutting may be done under water.
11. A CHOICE OF FINISH IS OFFERED. Three-tone walnut is standard. A special ivory finish may be had at a small additional cost. Metal parts are chromium.
12. INDUCTANCE DISC. This disc is a special feature of FISCHER Model "M". The advantage is the time-saving and convenience in making short wave applications.
13. AIR-SPACED ELECTRODES Air-spaced electrodes are generally used in pairs. A single air-spaced electrode may be used with an indifferent (pad) electrode.
14. MOBILITY. The large casters swivel easily and composition tires prevent damage to fine floors.
15. GUARANTEED PERFORMANCE. Every FISCHER Model "M" Short Wave Apparatus bears the well-known FISCHER guarantee of satisfactory performance.

No.		Code	Price
4425	**FISCHER Model "M" Short Wave Apparatus, equipped with flexible arm and inductance disc and including two condenser pad electrodes (5"x8"), F.O.B. Chicago**	TEAST	$425.00
4434	**Extra Supporting Arm, should two arms be desired for air-spaced electrodes**	TEBAC	35.50
4444	**Single Air-Spaced Electrode—consisting of electrode body, 4" disc, 2" disc and connecting cord**	TECAA	10.00

Ask for descriptive pamphlet Form 1829A

FISCHER Model "S" Short Wave Apparatus

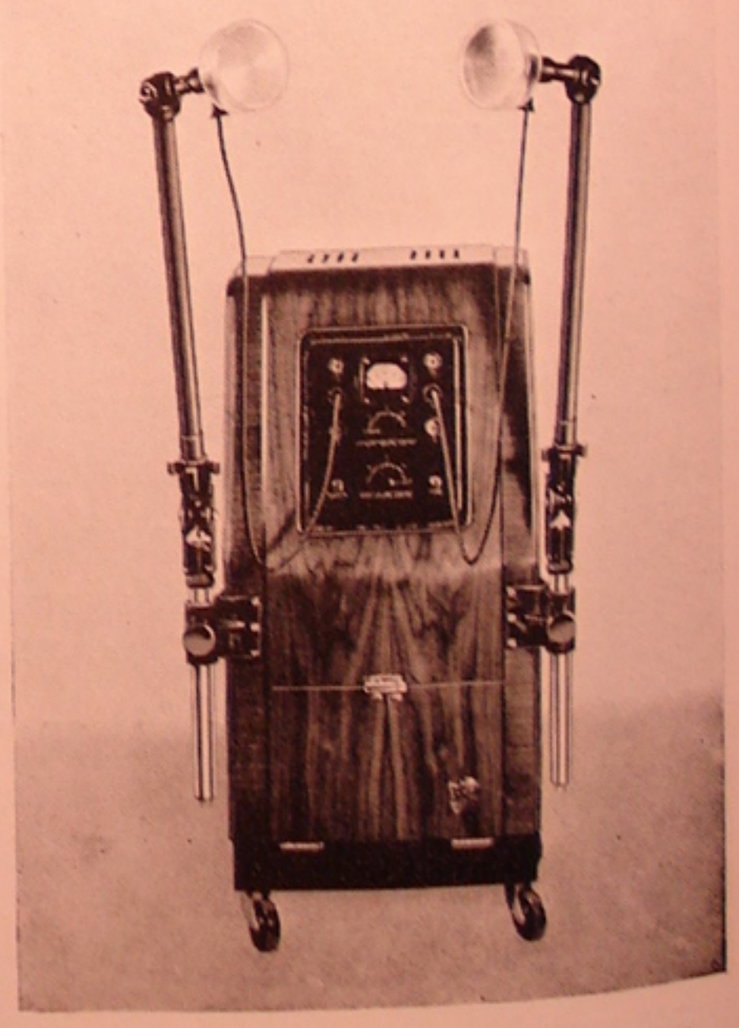
With Portable Section



THIS unit is distinguished first by being both a cabinet and a portable model. The entire short wave mechanism is housed in a portable section that can easily be lifted out of the cabinet for use in home or at bedside. In the second place, this is an all-service model, providing every short wave application. The inductance disc is regular equipment. When desired this model can be equipped with air-spaced electrodes as shown. Applications can also be made with inductance cable, cuff, pad or insulated orificial electrodes.

A third feature of FISCHER Model "S" permits users to select whichever wave length they prefer—either 6 meters or 12 meters. The desired wave length is to be specified in orders.

FISCHER Model "S" is a 4 tube apparatus. The power tubes have anodes of tantalum. A complete list of features of structure-operation is given below.



Features of Structure-Operation

1. Power is more than ample for every type of application. Heating is accomplished rapidly.
2. There are six patient's outlets—four for condenser electrodes and two for the inductance disc or cable.
3. Control is very fine, current can be applied to patient at any level up to maximum.
4. The tube circuit is balanced, assuring tube protection and economy.
5. Construction is highest quality throughout. Only the best materials are used.
6. The electrosurgical currents are especially effective, giving superb results.
7. Satisfactory performance is guaranteed.
8. Finish is optional—two-tone walnut or plain ivory. Metal parts, chromium.

No.		Code	Price
4420	**FISCHER Model "S"—12 meters—complete with flexible arm and inductance disc, also 2 pad electrodes (5½"x8½")**	TIALM	$365.00
4422	**FISCHER Model "SP"—12 meters—portable section only with inductance cable (including separator blocks) and 2 pad electrodes (5½"x8½")**	TIANO	290.00
4520	**FISCHER Model "S"—6 meters—complete with flexible arm and inductance disc, also 2 pad electrodes (5½"x8½")**	TIAOR	375.00
4522	**FISCHER Model "SP"—6 meters—portable section only with inductance cable (including separator blocks) and 2 pad electrodes (5½"x8½')**	TIARS	300.00

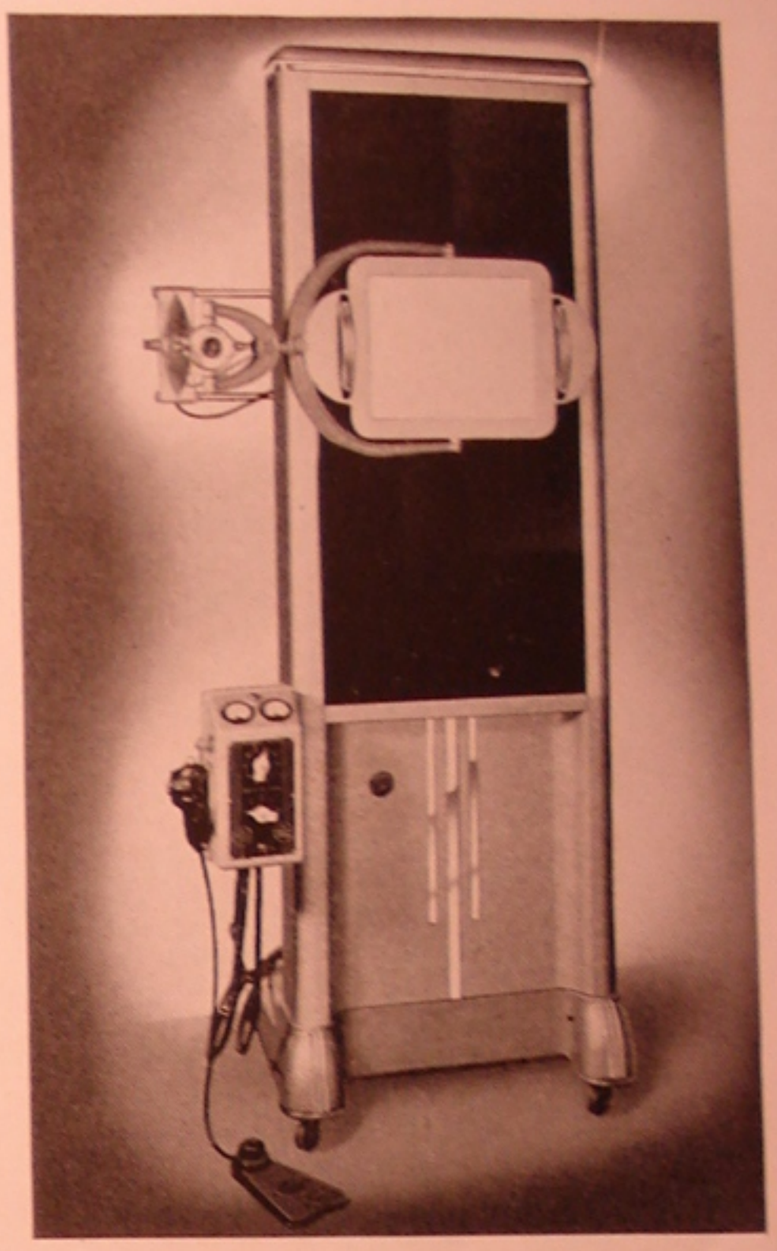
Ask for descriptive pamphlet Form 1863

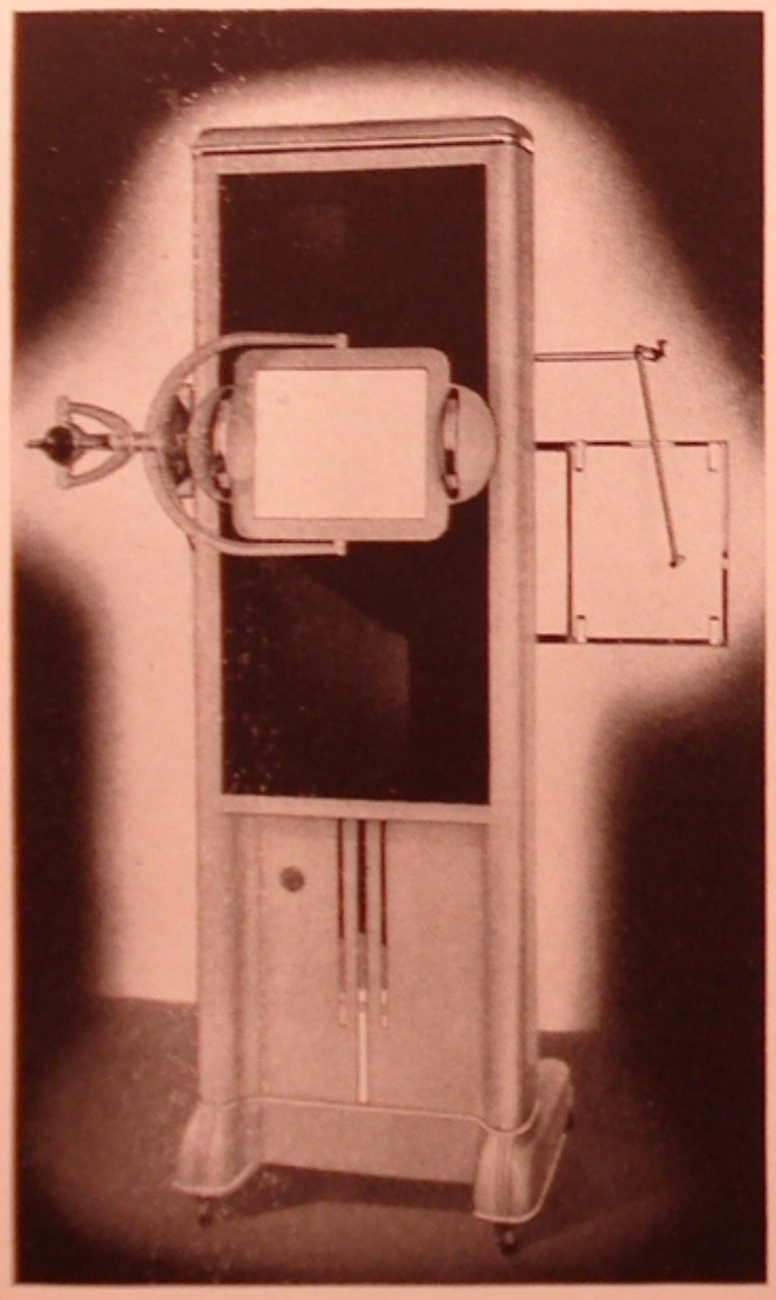
FISCHER Model "GF-15" Shockproof Fluoroscope with Radiographic Facilities

THIS unit has been designed with two distinct purposes in mind: first, it is a very high-quality fluoroscope, as shown in the adjoining illustration; second, used with a table, it provides a wide range of radiographic facilities. Further, the tubehead and control box may easily be removed and with a simple table-stand make a fine portable radiographic unit. The special control box permits variation of both milliamperage and kilovoltage.

FISCHER Model "GF-15" is not only a very high quality apparatus in materials and construction, massive and sturdy, but it gives superb performance. Power is up to 15 M.A. and up to 85 P.K.V. In the illustration below is shown, attached to the apparatus, the FISCHER Orthodiagraphic Attachment for heart tracing. The following list of features of structure-operation emphasize the chief merits of this apparatus.

* * *





Features of STRUCTURE-OPERATION

1. FISCHER Model "GF-15" Fluoroscope is shockproof throughout. Construction is of the oil-immersed type.
2. Flexibility of this unit is a marked feature. Counterbalancing is exact and screen moves at the touch of a finger.
3. The latest-type fine-focus hot cathode tube is used. It is designed to give exceptional definition in both radiography and fluoroscopy.
4. The fluoroscopic screen is the Patterson Type "B", measuring 10"x12".
5. The shutters are adjustable both horizontally and vertically permitting any limitation of screen area.
6. The high voltage transformer is designed to provide stable operation at high efficiency under all load conditions.
7. The panel is pure bakelite, free from grain.
8. All materials and all construction work are guaranteed highest quality.
9. Apparatus furnished to operate on either 110 volts or 220 volts.
10. Finishes are black Kristokrak or hammered gray. Special finishes at slight extra cost.

No.		Code	Price
4525	FISCHER Model "GF-15" Fluoroscope, including No. 4480F control, Patterson "B" screen, foot switch	TICHJ	$835.00
4358	Casters and Locks for FISCHER Model "GF-15" Fluoroscope	TATAT	7.50
4360	FISCHER Orthodiagraphic Attachment	TEBOP	75.00
408D	Hand Timer, calibrated in one-fourth seconds, up to 12 seconds	TIBSR	42.00

Ask for descriptive pamphlet Form 1788A

FISCHER MODEL "60-88"

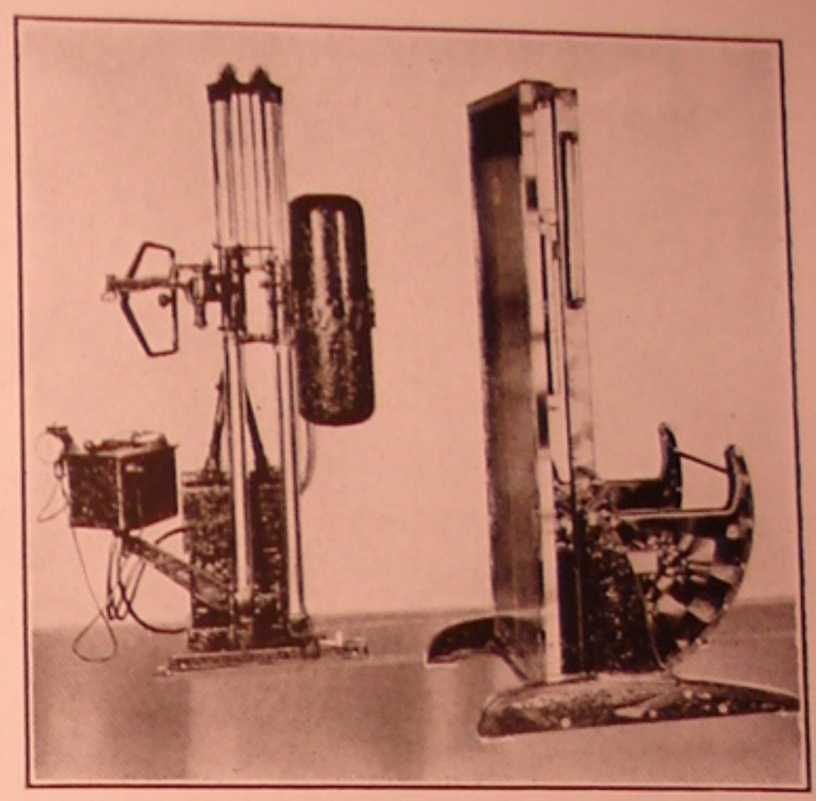
Diagnostic Shockproof X-Ray Apparatus



Diagram of space needed for Model "60-88." Unit with table measures, 9½ feet long, 5½ feet wide, 7 feet high. Divisions between small lines perpendicular to border equal 1 foot.

THIS apparatus represents unquestionably one of the greatest advances in efficient, compact x-ray manufacture ever made available to physicians. It is absolutely shockproof to both operator and patient. Overall dimensions are approximately 9½ ft. long, 5½ ft. wide, 7 ft. high. Any of the positions required, in either radiography or fluoroscopy, can be arranged as desired. Change from one position to another requires but a few seconds. With the exception of deep therapy, which lies outside the field of radiography and fluoroscopy, and requires specially designed apparatus, this unit will give every x-ray service required by the physician. Superficial therapy is obviously possible. Using modern films and high-speed screens, this FISCHER Model "60-88" will give a diagnostic service virtually equal to that of any other unit at any price. Designed for physicians' offices, hospitals, sanitariums and clinics. For general x-ray purposes, there is no competing apparatus on the market today that offers more in simplicity, flexibility, all-diagnostic performance and economy of investment.

The large illustration shows position for horizontal radiography. Other positions are shown in the small illustrations. For those who desire it, the FISCHER Roentgenographic Table, shown in lower illustration, will be installed in place of the FISCHER Tilt-Table. The uprights are of seamless steel, chromium plated. The track is plated steel. The insulation is sufficient to withstand voltages far beyond anything that can ever develop in actual use. The apparatus as a whole is guaranteed to be exactly as represented and to give the service claimed. It has been built up to FISCHER standards—in reality sets an entirely new standard of x-ray construction and operating efficiency. The simplicity of this unit, using a single tube, fluoroscopic screen, and Bucky diaphragm (heretofore requiring 2 or 3 separate units), and adjusting readily to any requirement, has reduced manufacturing costs to a point where the selling price is exceptional. Physicians who are using this apparatus heartily endorse it as the most outstanding x-ray apparatus available today.



Position for vertical radiography. Tube stand at opposite end of track. Full radiographic distance possible. No tools needed for changes.

Outstanding Features of STRUCTURE—OPERATION

1 This unit is absolutely shock-proof, when properly grounded—safe for both patient and operator.

2 Any required position may be arranged instantly—no tools needed.

3 Small installation space is required.

4 Only the very finest materials are used—the finish is attractive—black Kristokrak is standard. Smooth ivory and special finishes at slight extra cost.

5 The control unit is equipped with both volt and milliampere meters.

6 The FISCHER Synchrotimer and a foot switch go with the unit.

7 By means of convenient locking devices, the apparatus can be locked instantly in any desired position.

8 A circuit breaker is provided as an additional safety feature.

9 This unit will deliver 60 milliamperes at 88 K.V.P. on a 220 volt line—30 milliamperes at 88 K.V.P. on a 110 volt line.

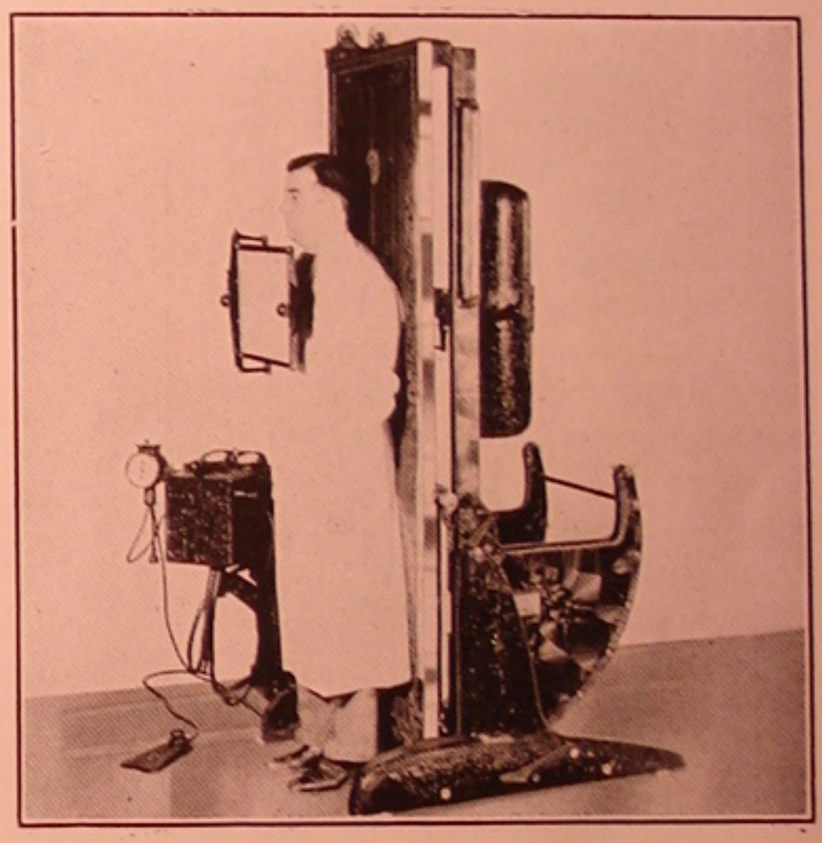
10 The table is full length instead of the usual 72". When desired the FISCHER Roentgenographic Table will be furnished.

11 The FISCHER line-focus hot cathode x-ray tube is enclosed in lead glass shield and metal container.

12 The fluoroscopic screen measures 12" x 16"—is the Patterson Type "B."

13 The FISCHER-Bucky diaphragm may be used in any position from horizontal to vertical—or not used as desired.

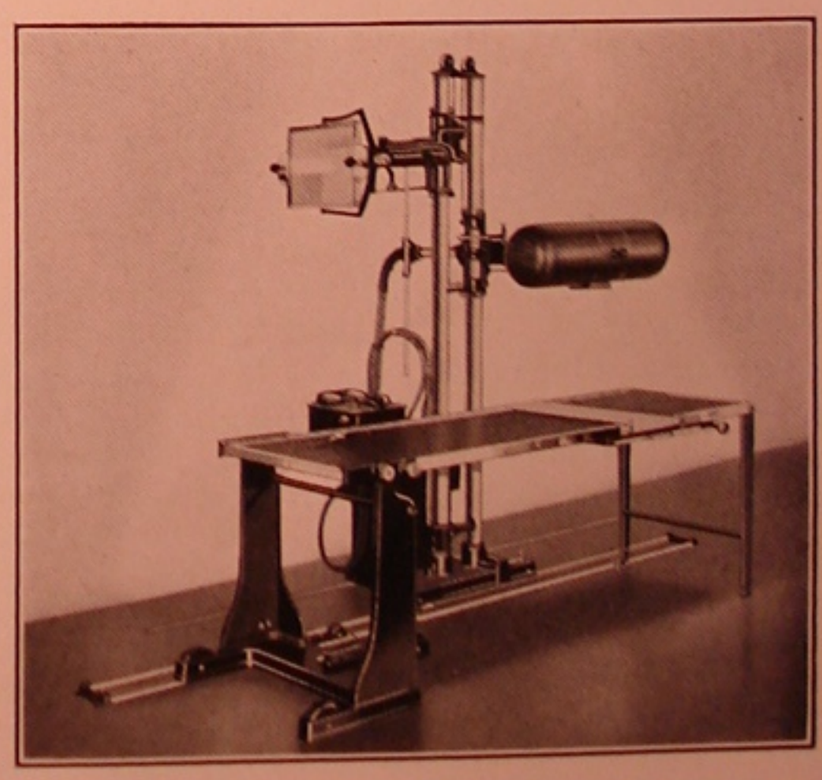
14 This unit provides every service that can possibly be required of an x-ray apparatus, outside of deep therapy, in offices, hospitals, sanitariums and clinics.



Position for vertical fluoroscopy. Table perpendicular. Screen and tube again lock in unison and move as required.

No.	::	Code	Price
T2925	FISCHER Model "60-88" Shockproof, Diagnostic X-ray, Apparatus, including FISCHER Tilt Table, rails, X-ray tube, circuit breaker, meters, Bucky diaphragm, automatic synchrotimer and foot switch	TAHII	$2018.60
2925	FISCHER Model "60-88" Shockproof Diagnostic X-ray Apparatus, same as No. T2925 except arranged with FISCHER Roentgenographic Table	UNSIX	1918.60

Prices on other arrangements on request. Ask for descriptive pamphlet Form 1651.



Roentgenographic Table
FISCHER Model "60-88" shown with FISCHER Roentgenographic and fluoroscopic table. Table adjustable to upright position. Affords both horizontal and vertical radiography and fluoroscopy.

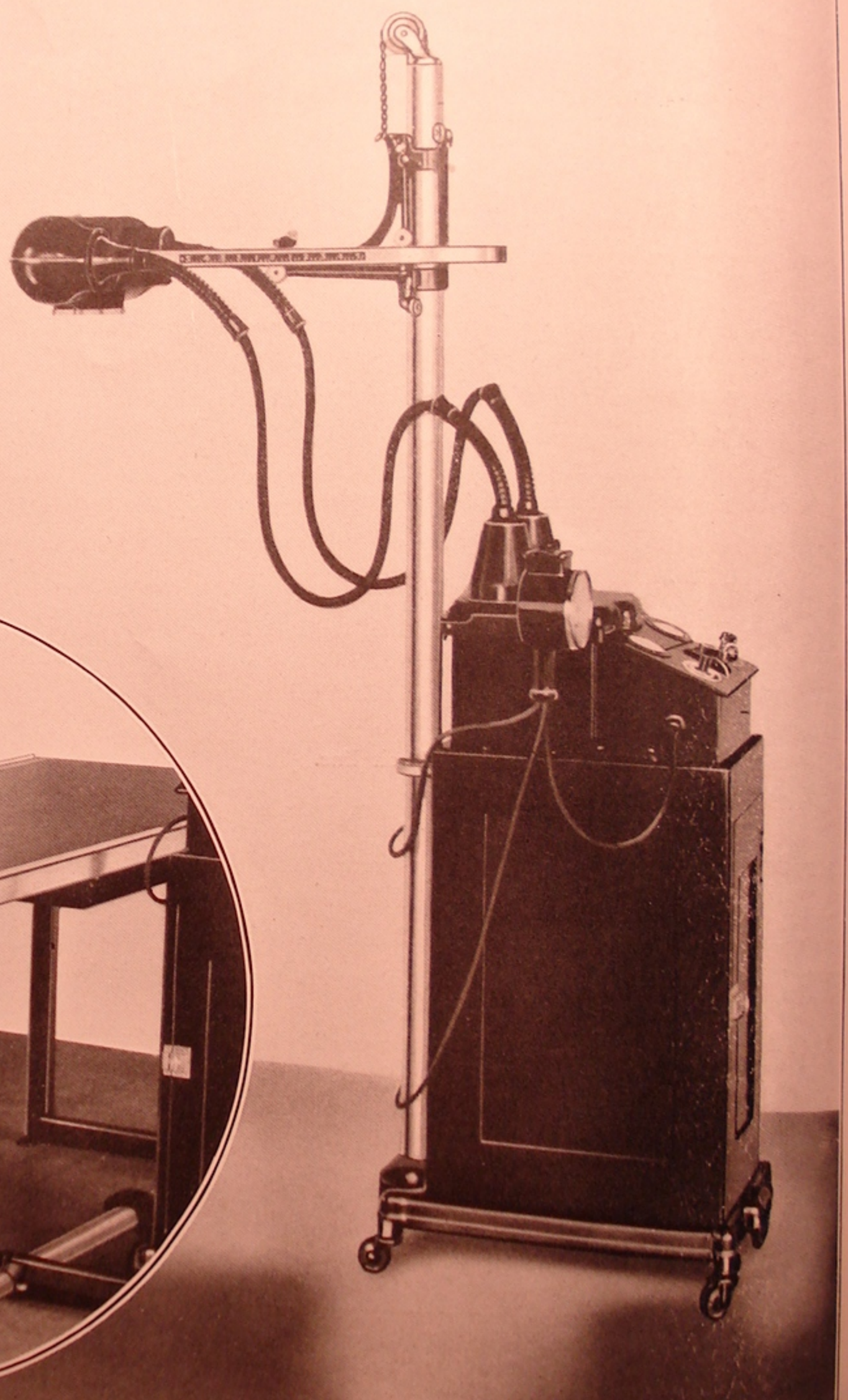
FISCHER MODEL "DSP-20"

Diagnostic; Shockproof: X-Ray Apparatus

A low cost mobile and transportable unit designed to serve as original installation or as supplementary mobile unit to large, fixed installation.

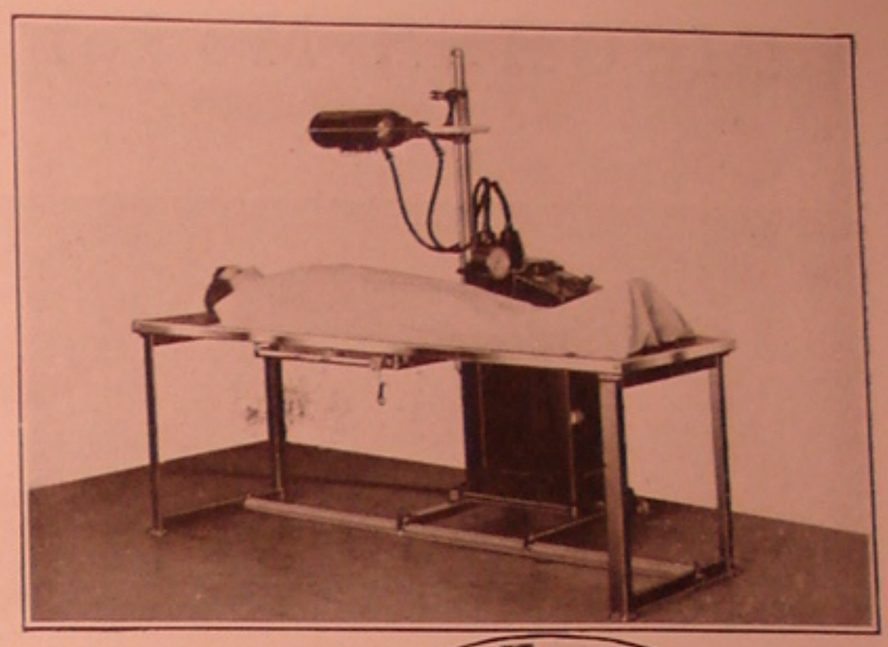
THE diagnostic value of an x-ray in medical practice needs no comment. It is universally recognized. Both radiography and fluoroscopy have value. Heretofore the chief obstacle preventing many physicians from installing x-ray equipment has been lack of office space or possibly cost of the apparatus. This new FISCHER Model "DSP-20" overcomes both difficulties. The unit is amply powerful, compact and efficient and the necessary investment within the means of any physician. Model "DSP-20" is surprisingly powerful and shockproof — both portable and transportable — it will serve virtually every radiographic and fluoroscopic need — is compact enough for even the smallest office and offered at a remarkably low



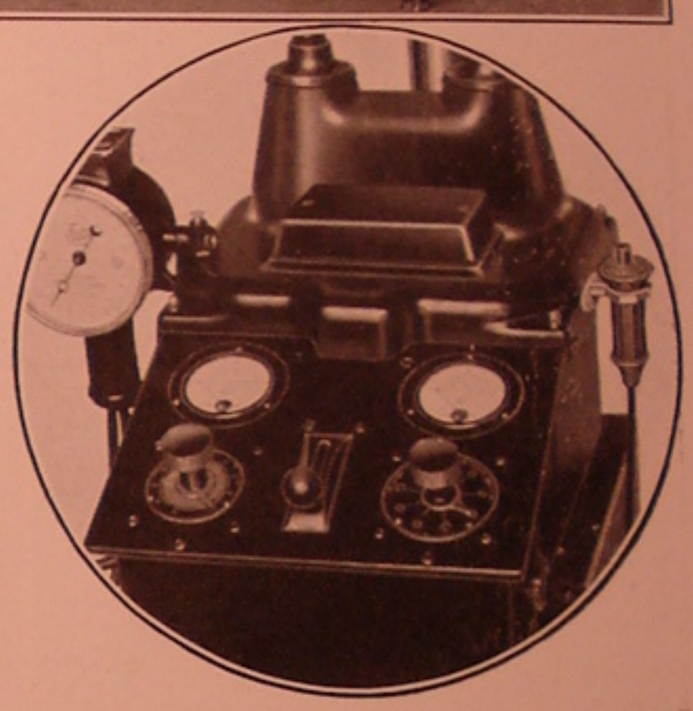


Unit available with or without table — any mounting preferred.

price. In pathology of heart, lungs, stomach, colon, sinuses, treatment of superficial skin lesions, and so on, this unit will give superb results. A chest negative showing finest detail can be made in 1/10 to 1/5 second. A knee or shoulder in ½ second. Stomach or colon negatives require only ½ to ¾ second. These results speak for themselves. Tube-head moves to any required position easily—locks securely. Unit may be used with or without table and Bucky. From every point of comparison this Model "DSP-20" is outstanding in its field—a marvel in power, flexibility and durability.



Position for horizontal radiography.



View of control box—synchrotimer, meters, and meter controls.

Features of "DSP-20" Construction and Operation

1 This unit is absolutely shockproof, when properly grounded—safe for both operator and patient.

2 It is mobile and transportable as desired—note illustrations showing various mountings. Can be knocked down and reassembled without tools.

3 It offers both radiography and fluoroscopy—changes from one position (or use) to another instantly made.

4 In power, this unit is a "20-67"—it delivers up to 20 M.A. and up to 67 K.V.P. This means four times greater speed on exposures over competing apparatus.

5 The control is very fine and applies to both milliamperage and kilovoltage. The meters are accurately calibrated.

6 Small installation space is needed—when knocked down for transport, unit without table packs readily into automobile seat.

7 Operation is the simplest of all units. Line current, 110 volts, 60 cycle.

8 Results are excellent. With modern films and high speed intensifying screens, this unit, for all general x-ray purposes, will equal practically any x-ray apparatus on the market.

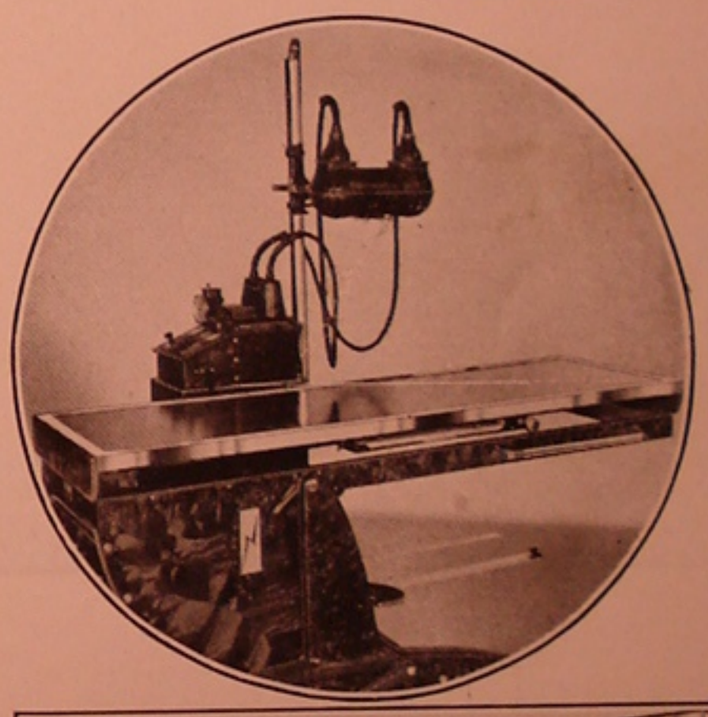
9 Materials and workmanship are highest quality. This is a low-priced, but not in any sense a cheap, unit. Accurately counterbalanced.

10 The latest fine-focus hot cathode tube is used. Tubehead takes any position or angle desired.

11 Equipped with FISCHER Synchrotimer and remote control switch.

12 Cabinet is lead-lined for storage and protection of films.

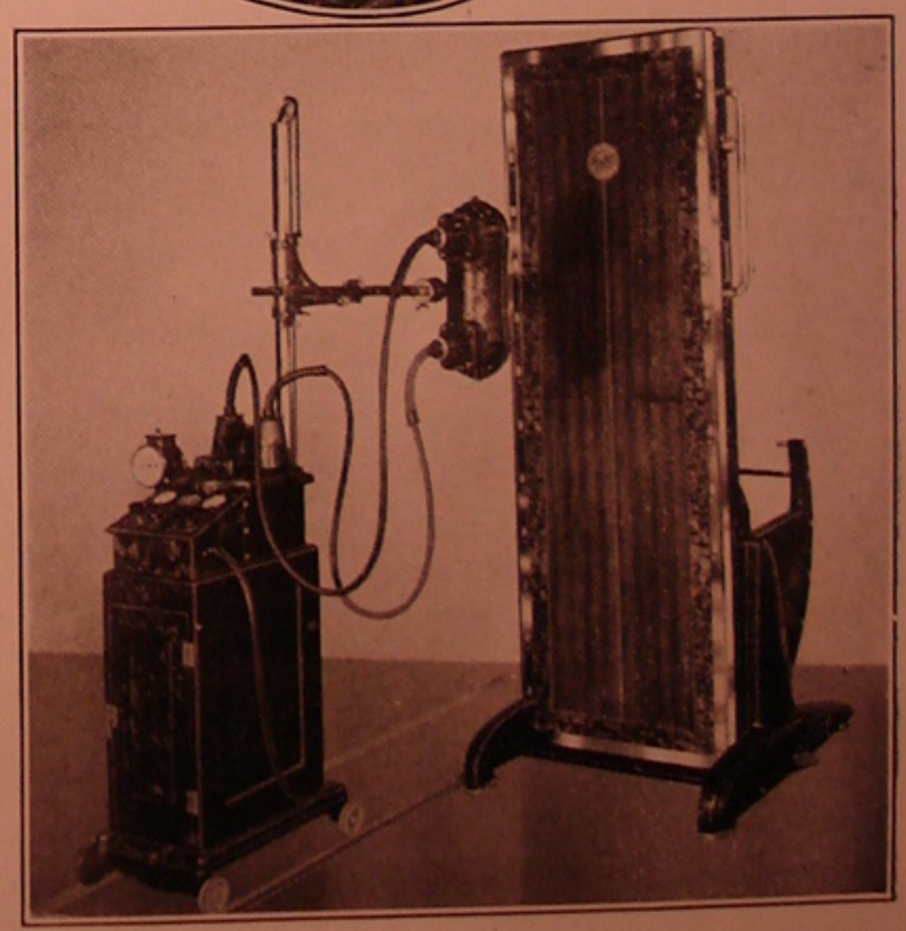
13 Finish is black Kristokrak, metal parts chromium. Can be had also in ivory.



Views of FISCHER Model "DSP-20" used with FISCHER Tilt-Table.

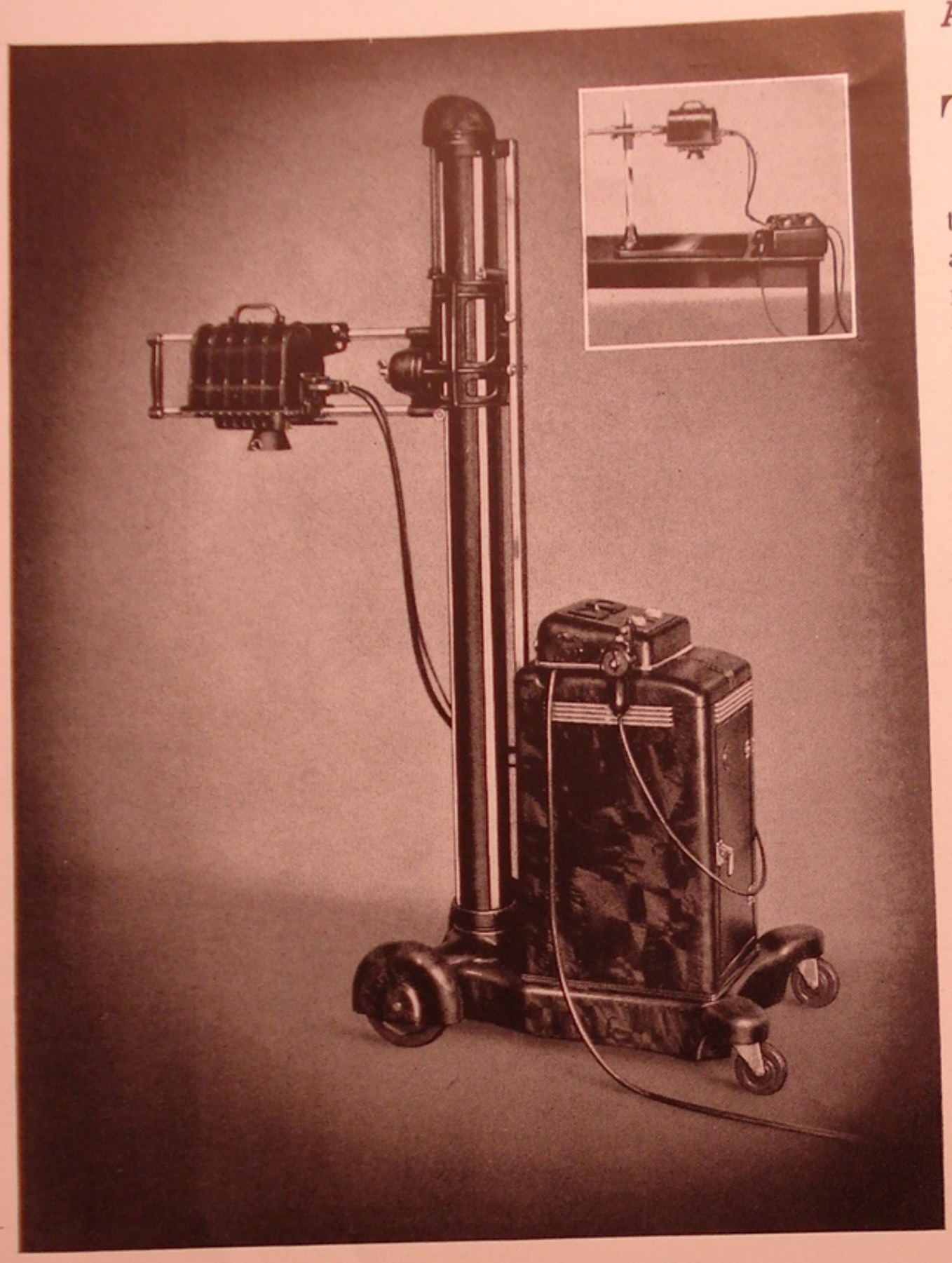
No.	::	Code	Price
3644AB	**FISCHER Model "DSP-20" mounted on lead-lined cabinet with iron base, long upright, casters, X-ray Tube and Electro-Synchrotimer**	HERBA	$700.00
3647AB	**FISCHER Model "DSP-20" mounted on lead-lined cabinet with iron base, long upright, carriages to ride on support under 3532 Table, X-ray Tubes and Electro-Synchrotimer**	HERNI	715.00
T3647AB	**Model "DSP-20" like 3647AB, including rails and carriage for use with Tilt-Table**	TAHUU	715.00
3649AB	**FISCHER Model "DSP-20" with cabinet, iron base, long upright, carriages, X-ray Tube, Electro-Synchrotimer, all as covered under Cat. No. 3647AB, with FISCHER Table and Bucky Diaphragm**	HECOM	1045.00
T3649AB	**Model "DSP-20" like T3647AB but with Tilt-Table and Bucky**	TAHZZ	1335.00

Ask for descriptive pamphlet Form 1506B.



FISCHER Model "DSP-20" may be installed, when desired, with the FISCHER Tilt-Table.

FISCHER Model "GM" Shockproof X-Ray Apparatus



Available as Mobile Unit or Mounted on Rails for Use with Table

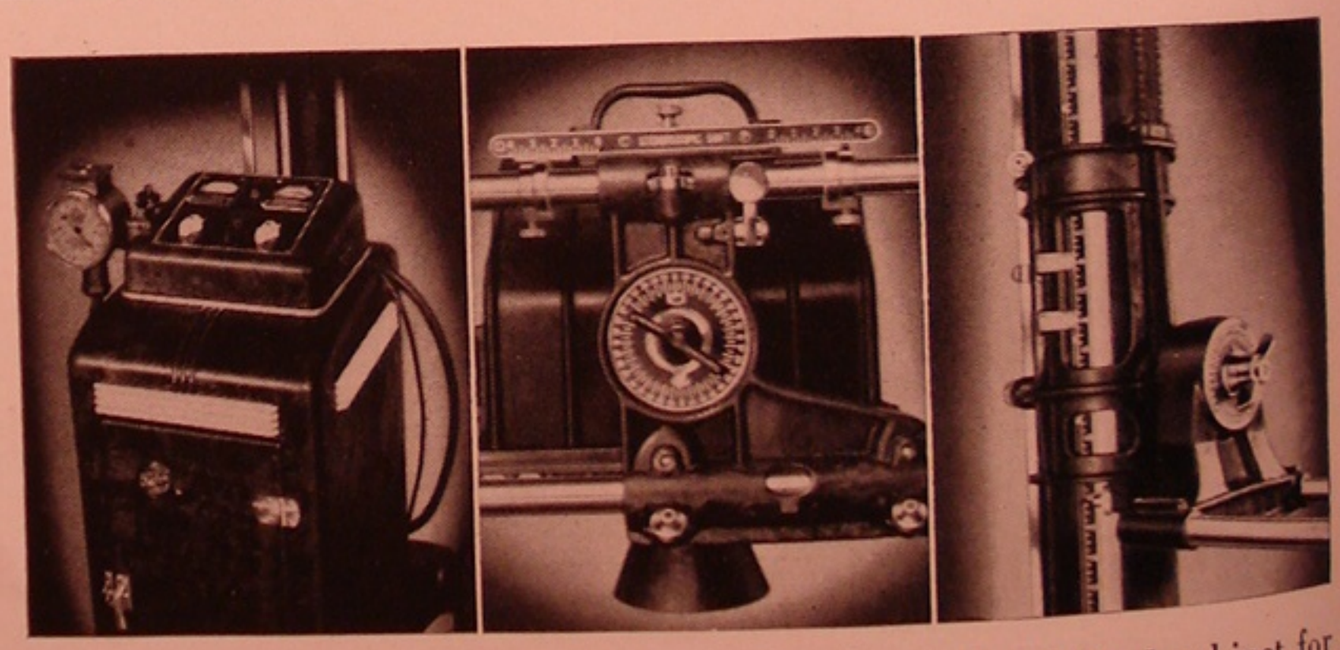
THIS remarkably flexible unit is recommended to physicians, hospitals, clinics, either as an original installation or as a mobile unit supplementary to a large fixed installation. Designed primarily for radiography, fluoroscopy is also possible with hand or operating fluoroscope. A noteworthy feature is the fine portable radiographic unit made by removing tubehead and control box and using a tablestand (note inset). Power available is up to 15 M.A. and up to 85 P.K.V. Performance is excellent. At 10 M.A. and 45 P.K.V., with high speed screens, a wrist or elbow requires only 1 sec. At 15 M.A. and 65 P.K.V., a P.A. chest requires only ½ sec. Fluoroscopic results are equally satisfactory.

The small illustrations below show various features of construction—the control stand, the stereoscopic shift, the vertical scale. Every electrical and mechanical feature of proven value has been built into this apparatus. Following are listed the more important features of construction and operation.

This apparatus is available in 30 M.A. capacity — FISCHER Model "GM-30." Information on request.

Special FEATURES

1. FISCHER Model "GM" is shockproof throughout. Construction is of the oil-immersed type.
2. The design permits complete flexibility of tubehead—tubehead can be lowered under table.
3. Control is very fine. Both milliamperage and kilovoltage are variable.
4. The latest-type, fine-focus tube is used—designed to give exceptional definition in both radiography and fluoroscopy.
5. The high voltage transformer provides stable operation at high efficiency under all load conditions.



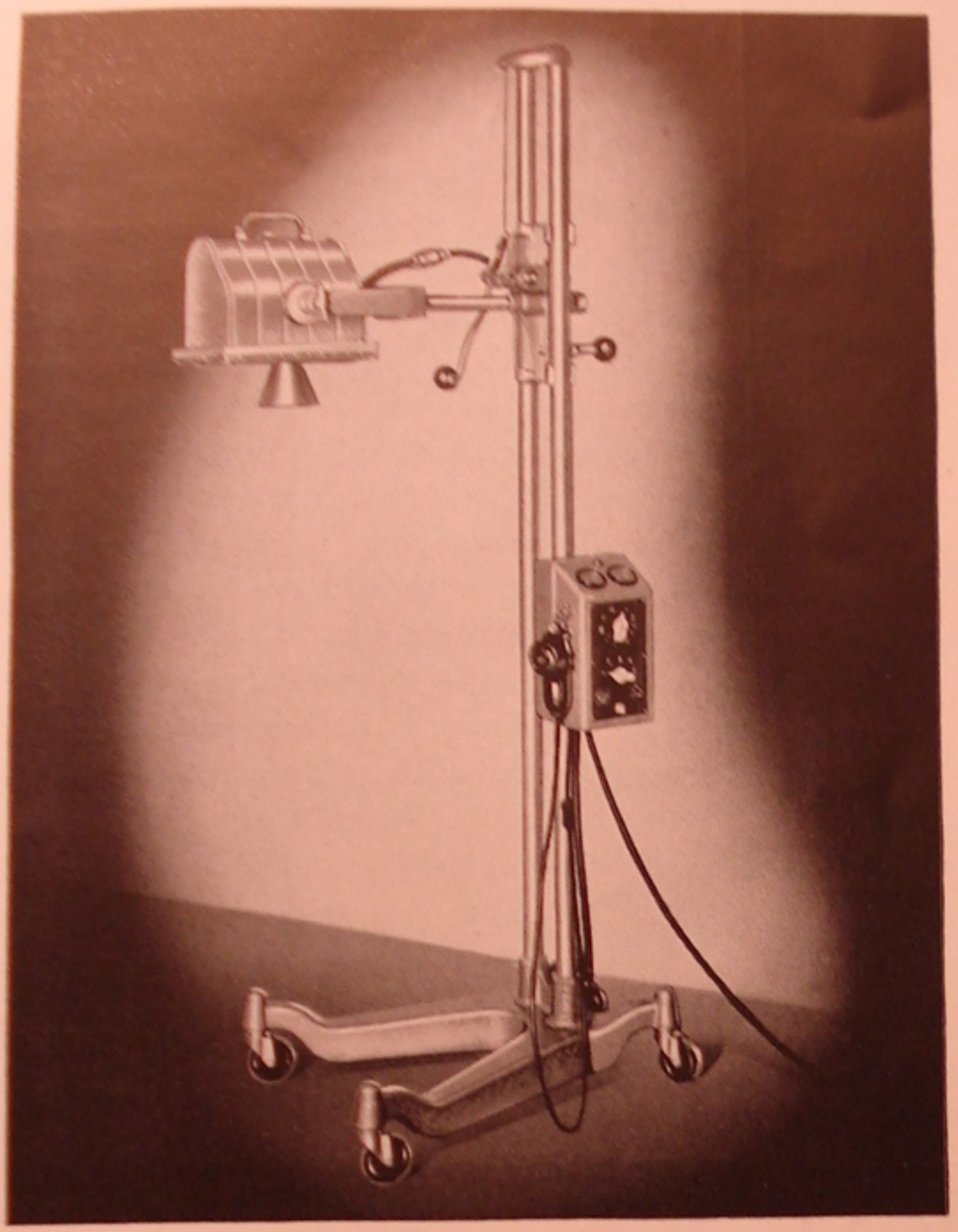
6. There is a double-compartment lead-lined cabinet for films.
7. Finishes are black Kristokrak or hammered gray. Special finishes at slight extra cost.

No.		Code	Price
4470	**FISCHER Model "GM" Mobile Shockproof X-Ray Apparatus, on casters with hand timer**	TEDAB	$895.00
4471	**FISCHER Model "GM" Mobile Shockproof X-Ray Apparatus, with hand timer and arranged to mount on set of 8′ grooved rails**	TEDBC	910.00

If FISCHER Synchrotimer is preferred instead of hand timer, add $15.50.

Ask for descriptive pamphlet, Form 1836.

FISCHER Mobile-Portable Shockproof X-Ray Apparatus



THE two x-ray units shown on this page are characterized by simplicity of construction and therefore exceptionally low cost. Within their power range, however, they give superb performance. Either unit may be used with or without table. Obviously also either unit provides fluoroscopy as well as radiography — using a hand or operating fluoroscope. Either of these units is recommended for original installation or as supplementary to a large fixed apparatus. Mobility and portability are features.

* * *

FISCHER Model "GA-15"

VIEW LEFT: This model delivers up to 15 M.A. and up to 85 P.K.V. It is equipped with a remote control box, permitting variation of both milliamperage and kilovoltage. There is a finest-quality hand timer, measuring time in one-fourth seconds, maximum 12 seconds. A very handy mechanism makes raising or lowering of tube-head simplicity itself. Positions lock fast.

FISCHER Model "HA-10"

VIEW RIGHT: This model differs from the model shown above in two respects—power is less (10 M.A. at 67 P.K.V.) and there is no remote control box. Both milliamperage and kilovoltage are fixed. The hand timer (not shown) is the same as used with Model "GA-15" above, also the mechanism for raising and lowering tube-head.

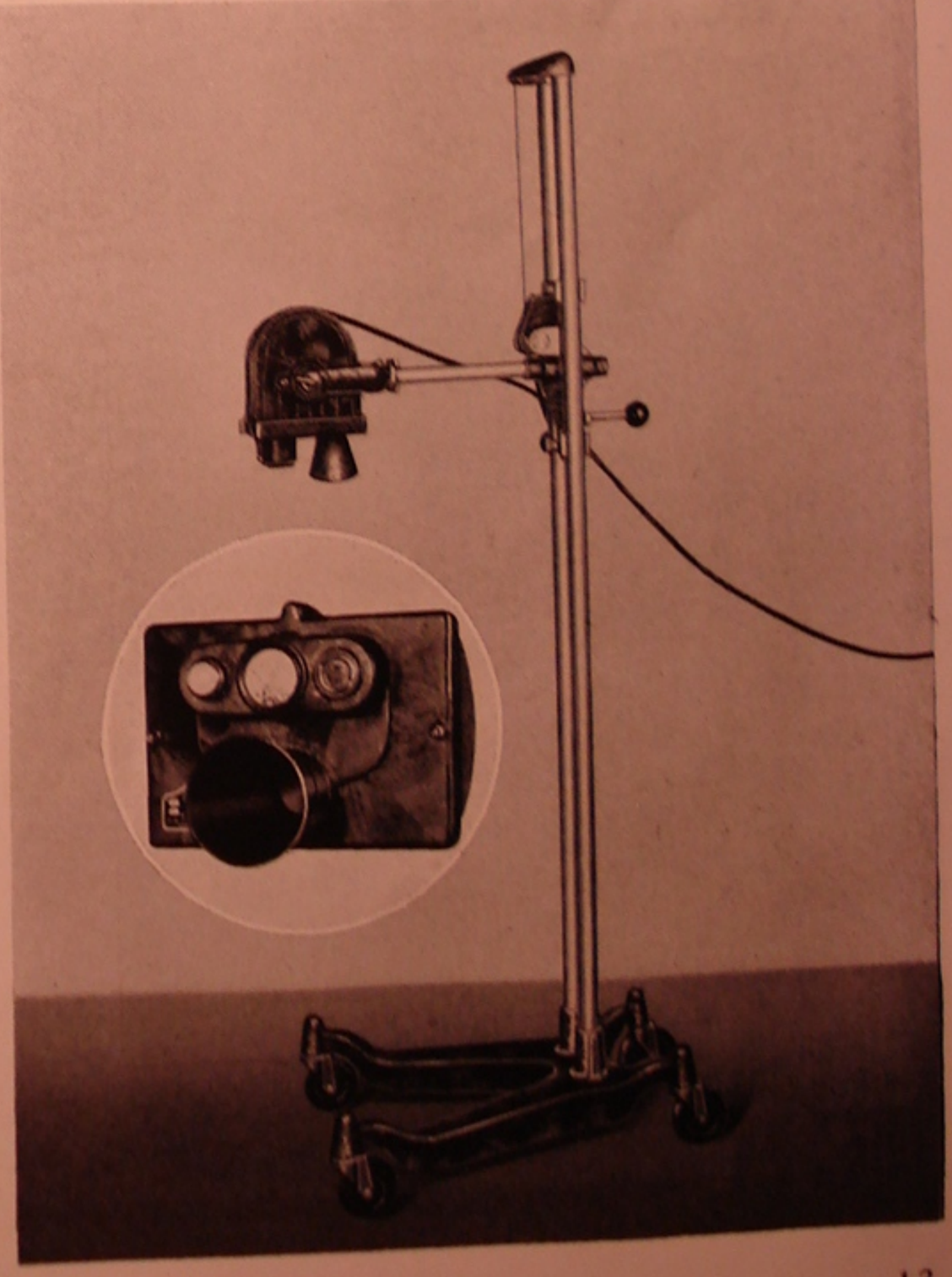
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FEATURES

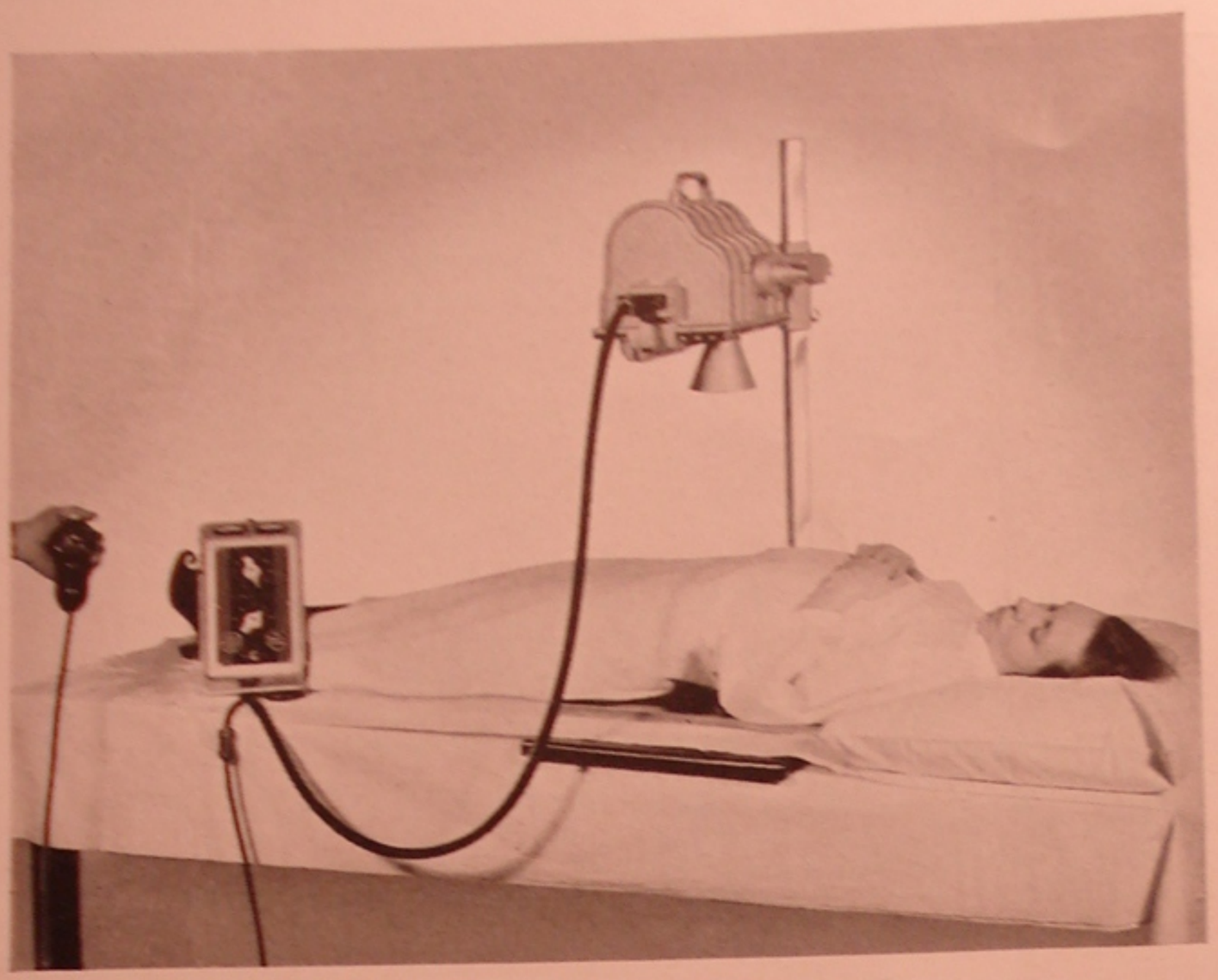
Features worthy of special mention, applying to both models, are: (1) shockproof throughout, both transformer and x-ray tube are immersed in oil; (2) complete flexibility, tubehead can be pointed in any direction; can be lowered under a table. Finish is optional—black Kristokrak or hammered grey.

No.	::	Code	Price
4478	FISCHER Model "GA-15" Shockproof X-Ray Apparatus	TIBTU	~~$600.00~~ $575.00
4479	FISCHER Model "HA-10" Shockproof X-Ray Apparatus	TIBUX	~~$525.00~~ $500.00

Ask for descriptive pamphlet Form 1866



FISCHER Model "G" Portable X-Ray Apparatus

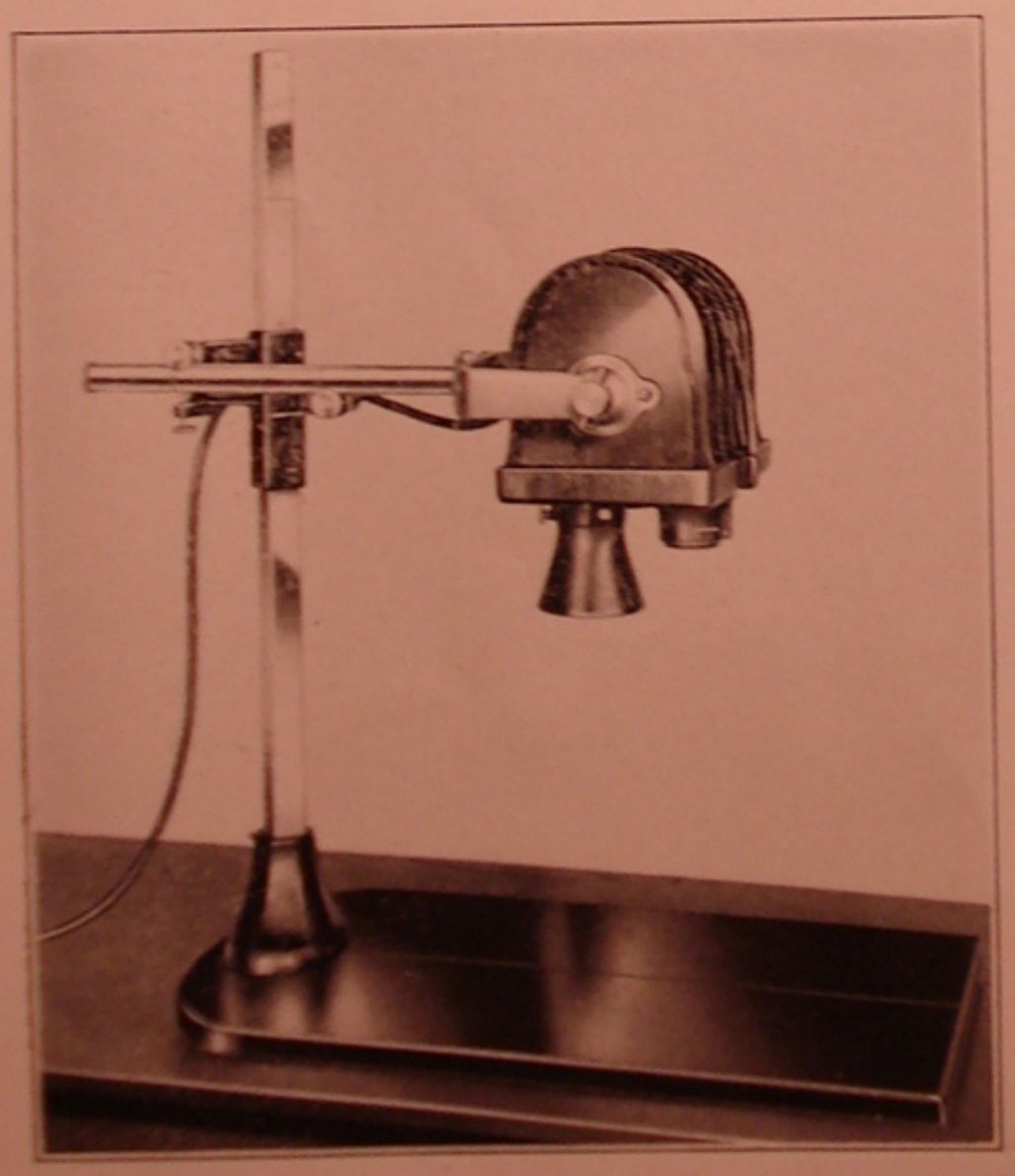


THIS unit is available in the arrangement shown — including tubehead, table stand, control box and hand timer. It has been designed to provide a truly portable unit giving fine performance at low cost. The following features are worthy of note: The unit is shockproof throughout; power is up to 15 M.A. and up to 85 P.K.V.; both radiography and fluoroscopy are available; the latest-type, fine-focus tube gives exceptional definition. With the special control box, both milliamperage and kilovoltage are variable. The hand timer measures time in one-fourth seconds, maximum 12 seconds. Quality materials and construction are used throughout. Finishes are black Kristokrak or hammered gray and chromium. Ivory finish at slight additional cost. When desired, this Model "G" may be had mounted on a special stand with four adjustable legs.

No.		Code	Price
4482	FISCHER Model "G" Portable Shockproof X-Ray Apparatus, including tubehead, table stand, control box and hand timer	TICAC	$515.00
4483	Same as above except table stand replaced by special stand with four adjustable legs	TICCA	507.50

Ask for descriptive pamphlet Form 1810

FISCHER Model "H" Portable X-Ray Apparatus



IN designing FISCHER Model "H", the purpose has been to provide a portable unit to meet specific needs. This unit is available either with table stand mounting or with adjustable-legs mounting as shown. There is no remote control box. The following features are worthy of note: The unit is shockproof throughout; it is easily portable; flexibility is marked; power is up to 10 M.A. and up to 67 P.K.V. Operation is very simple and both radiography and fluoroscopy are available. The tube gives exceptional definition. Construction throughout is highest quality. The finish is black Kristokrak or hammered gray and chromium. Special finishes at slight extra cost.



* * *

No.		Code	Price
4408	FISCHER Model "H" Portable Shockproof X-Ray Apparatus, table stand mounting	TAEJK	$450.00
4125	FISCHER Model "H" Portable Shockproof X-Ray Apparatus, adjustable leg mounting	TAMEB	450.00

Ask for descriptive pamphlet Form 1755C

FISCHER Model "SP-60"

AVAILABLE with table or Wall Frame and Bucky or as Mobile Unit. Primarily a radiographic unit, although excellent fluoroscopy also possible.



Features of STRUCTURE-OPERATION

1 Positively SHOCKPROOF . . . when properly grounded.

2 Superior in POWER . . . when operating on an adequate 220 volt line, 60 M.A. are delivered through the tube at 88 K.V.P. (full 5" gap). 30 M.A. are delivered at 88 K.V.P. on a 110 volt, 60 cycle line.

3 All-diagnostic RADIOGRAPHY . . . also FLUOROSCOPY . . . available. The variable milliamperage and kilovoltage permits the exact penetration needed.

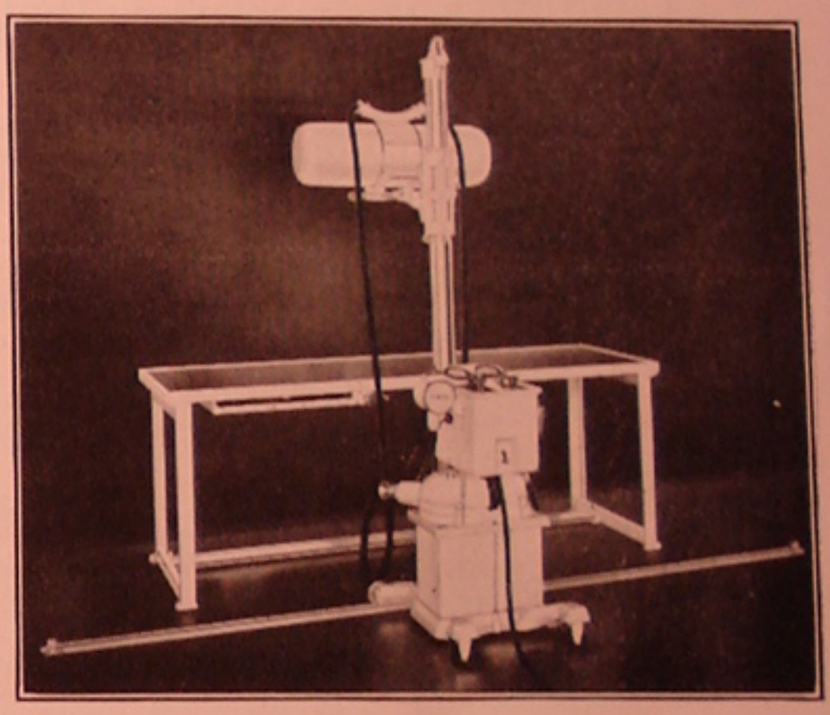
4 COMPACTNESS and MOBILITY are features. Only small space needed for installation.

5 Lifetime DEPENDABILITY . . . is built into this "SP-60." All materials and parts, timer, tubes, and so on, are the best produced.

6 The controls are visible and convenient. There is a double control for each meter.

7 The TUBE . . . is the special FISCHER-built latest type, very-fine-line-focus, hot cathode X-ray tube.

8 Attractive FINISH . . . black Kristokrack and chromium or special at slight additional cost.



No.	::	Code	Price
3850	FISCHER Model "SP-60" Shockproof Radiographic Apparatus	JABON	$995.00
3852	FISCHER Model "SP-60" (same as No. 3850) with Table and Bucky	JACAR	1340.00
3858	FISCHER Model "SP-60" mounted on rail, including Table and Bucky	JADEO	1340.00
3856	FISCHER Model "SP-60" Shockproof Radiographic Apparatus, including Wall Frame and 36" Bucky	JAKOT	1465.00

May be had with FISCHER Tilt Table.

Ask for descriptive pamphlet Form 1553

FISCHER Wall-Mounted Shockproof Dental X-Ray Apparatus



A HIGHEST-QUALITY apparatus, embodying every advanced feature, of mechanical and electrical construction. Designed for wall-mounting only. Among outstanding features are the following:

1. This unit is absolutely shockproof throughout. No exposed high tension wiring.
2. It is 100% flexible. All positions easily and instantly obtainable while patient remains seated in the dental chair.
3. Power is more than ample and radiographic results are excellent.
4. Control is very fine. Angles can be reproduced.
5. Construction is very compact. Only the finest materials are used. Tube and transformer housed in one-piece drawn steel tank.
6. Optional finish—ivory or mahogany.

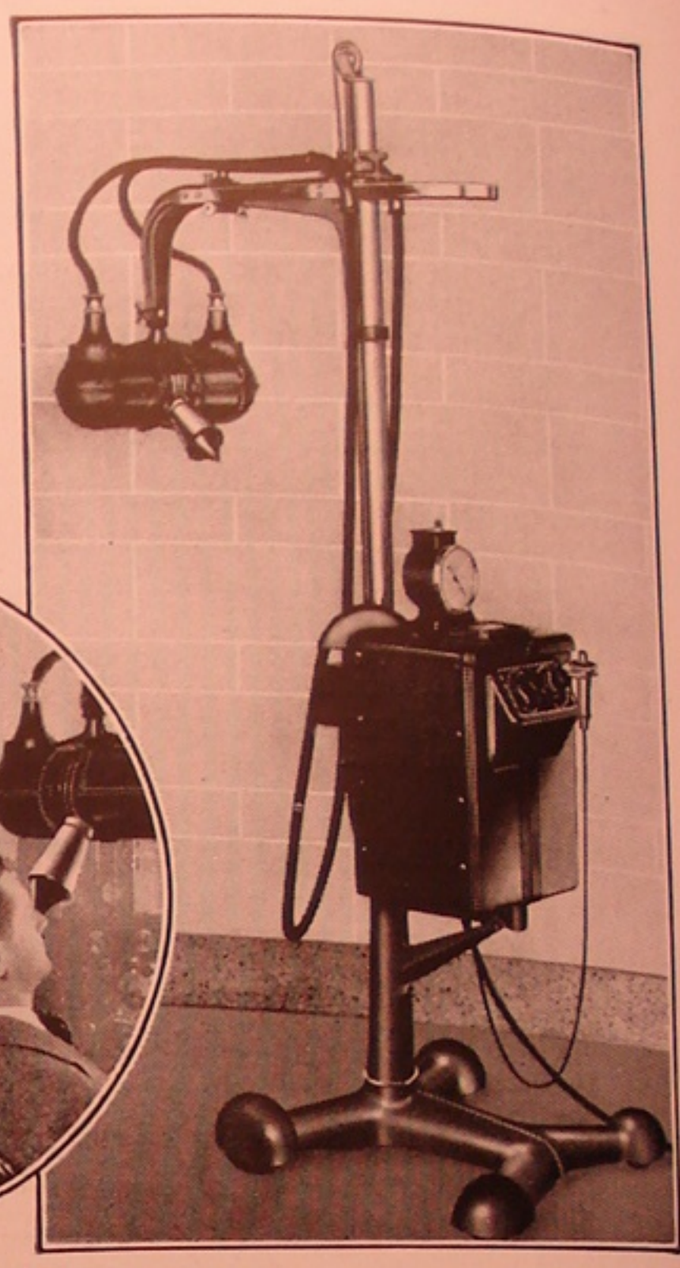
No.	::	Code	Price
4485	FISCHER Wall-Mounted Shockproof Dental X-Ray Apparatus	TIBRS	$750.00 ~~$825.00~~

Ask for descriptive pamphlet Form 1869

FISCHER Shockproof "DENTAL-X"

Absolutely safe electrically . . . superior in power . . . 100% flexible . . . mobile . . . and assures finest radiographic results.

THIS FISCHER Shockproof "DENTAL-X" is unique in its field. In the first place, it has far more power than any competing apparatus—at 67.5 P.K.V., it delivers 20 M.A. through the tube. This means much greater speed in exposures. The tube may be used farther from the object for clearer detail. In the second place, both kilovoltage and milliamperage are variable, and under separate controls, affording the exact penetration needed. In the third place, every position necessary can be obtained immediately while the patient remains seated in the dental chair. Easy mobility is made possible by large wheels and casters.



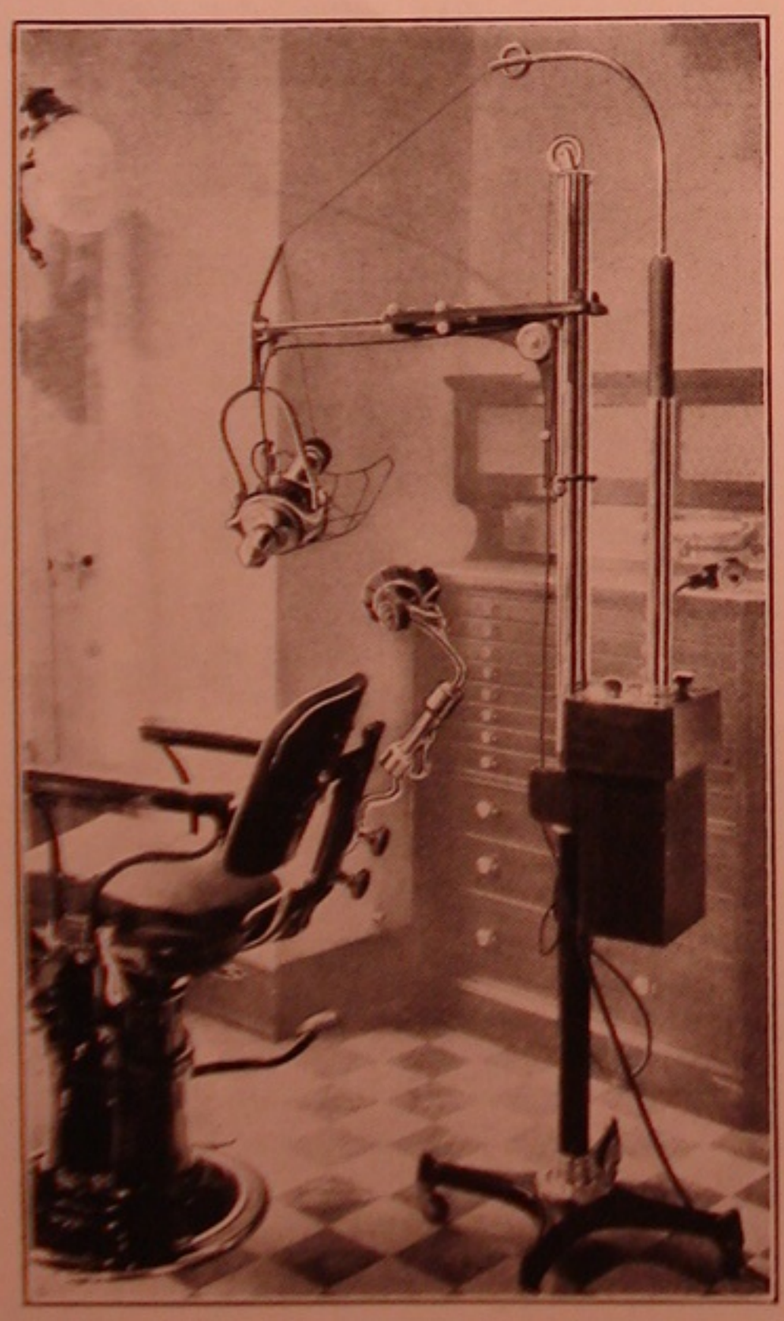


Features of Construction and Operation

This unit embodies every known feature of sound electrical and mechanical x-ray construction. It will give a lifetime of dependable service. Construction is very compact. Controls are simple. The tube is FISCHER-built of the fine-line-focus. The synchrotimer measures time in 1/10 seconds. There is a remote control switch. Counterbalancing is exact. Friction locks are provided. There is a lead box for film protection. Optional finish—black, mahogany or ivory. Metal parts chromium. Operates on a 110 volt, 60 cycle line.

No.	::	Code	Price
3832AB	FISCHER Shockproof "Dental-X"	SACRR	$775.00

Ask for descriptive pamphlet Form 1540D.



FISCHER "DENTAL-X"

ALTHOUGH not shockproof, this unit is absolutely safe electrically. It was designed to embody two ideas—(1) to give service of highest quality and (2) to be priced within the means of every dentist. The special features include: 1. Ease of manipulation. Any position desired can be obtained almost instantly. 2. Simplicity of electrical controls. All switches, meters, timers, controls are at your finger tips. 3. Mobility. The unit can be moved anywhere easily. 4. Automatic circuit breaker absolutely protects both patient and operator. 5. Duplication of positions. Dial indicates exact angles. The price quoted covers the FISCHER hot cathode tube, heavy duty transformer, lead glass shield, volt meter, milliampere meter, time switch, circuit breaker, dental cone, flexible tube carrier. The finish is clear-grained mahogany, polished aluminum and chromium—black or ivory if preferred.

ADVANTAGES

1. It uncovers additional work and convinces patients of the need to have work done.
2. It adds to income by radiograph fees and naturally fees from the additional work uncovered.
3. It satisfies patients because they see actual conditions—helps dentists to convince patients when work needs to be done.
4. It helps you to retain patients—proves to be an excellent good-will builder.
5. It helps you to check the accuracy of your work.
6. You can do radiographic work for other dentists and physicians.

No.	::	Code	Price
2240	FISCHER "DENTAL-X" Chromium Plate	DENTA	$595.00

Ask for descriptive pamphlet Form 1183A.

FISCHER Model "CSWI" Combination Cabinet



Combines, in one cabinet, Short Wave, a Galvanic Current, Desiccation, Cautery, a Diagnostic Circuit, Pressure and Suction

A REMARKABLE unit, designed for the eye, ear, nose and throat specialist, and equally valuable for other physicians who desire such facilities. The cabinet has motor and 2-cylinder pump that delivers both steady and vibrating compression and vacuum . . . the compression and vacuum working off separate pumps. The short wave apparatus is an all-service unit—12 meter wave length. In addition this cabinet has a separate generator for high frequency to be used for fulguration or desiccation. A separate and complete generator for the galvanic current. There is also hot cautery and a diagnostic light circuit. Briefly, there is compression for atomizing and nebulizing, vacuum for such purposes as is desired, short wave in all of its application including coagulation, galvanic current for ionization and a fulguration current for fulguration or desiccation for warts, moles, and so on. Materials and construction are the finest.

FEATURES OF STRUCTURE — OPERATION

1 Short wave facilities. The short wave unit embodied in this Specialist's Cabinet provides all short wave applications.

2 Ample power. It is a simple matter to heat any area large or small.

3 Electro-surgery (coagulation). Electrodes plug directly into patient's outlets.

4 Electro-surgical tissue-cutting. A fine tissue-cutting current also available.

5 Galvanism. This is a straight line, galvanic current, perfectly smooth and under very fine control.

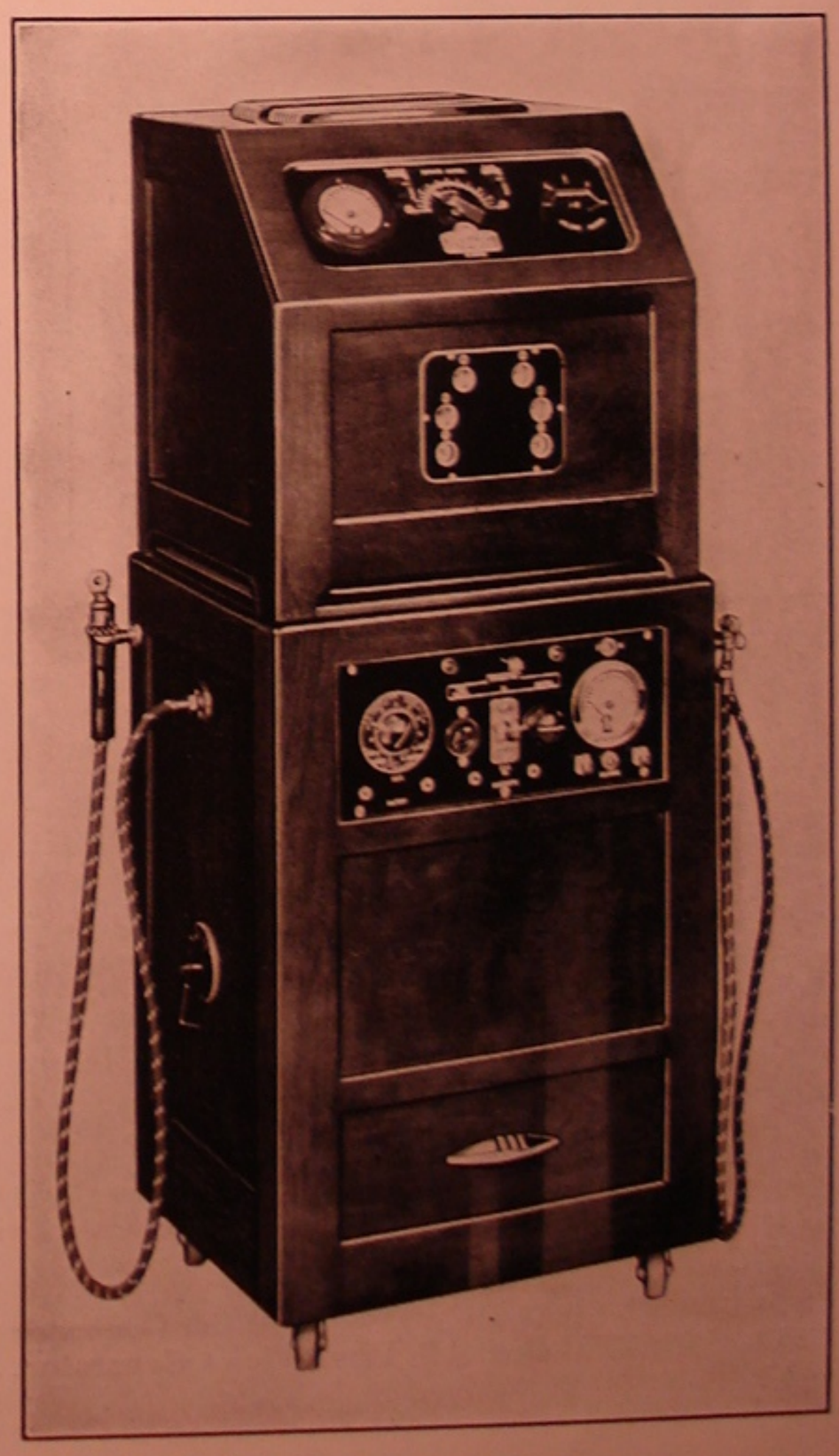
6 Desiccation (fulguration). Power is adjustable, ample, current unipolar, high voltage, low amperage.

7 Cautery. Actual, low voltage, high amperage, under fine control.

8 Diagnostic Circuit. Illuminates bulb furnished with cabinet. Will illuminate most any bulb used for diagnostic purposes.

9 Suction and suction-vibration. Under fine control. Produces about 14.5 vacuum. Pressure and pressure-vibration. Pressure up to 26 lbs. Sprays — for atomizer, nebulizer, powder blower and similar sprays.

10 Finish optional — mahogany or ivory. Metal parts chromium.



List of Accessories Included with Cabinet

1 Cat. No. 301 Cautery Handle (adjustable to five positions).
1 Cat. No. 305A Cautery Knife.
2 Cat. No. 307 Cautery Cords.
1 Cat. No. 335 Diagnostic Illuminator (cords, holder and lamp).
1 Cat. No. 3974 Dillinger Electrode.
3 Cat No. 1520 Bottles with Rubber Stoppers.
1 Cat. No. 1521A Atomizer.
1 Cat. No. 1522A Nebulizer.
1 Cat. No. 1523A Powder Blower.
1 Cat. No. 1551 Medium Vibratode (metal holder).
1 Cat. No. 1551R Soft Rubber Cap for No. 1551.
2 Cat. No. 3456 Pad Type Short Wave Electrode.
1 Cat. No. 3460 Cuff Type Short Wave Electrode.
1 Cat. No. 3461 Cuff Type Short Wave Electrode.
1 Cat. No. 3932 Inductance Cable.
1 Cat. No. 1900 Galvanic Needle Holder.
1 Cat. No. 1901 Dozen Galvanic Needles.
1 Cat. No. 1931 Pair Galvanic Cords.
1 Cat. No. 690 Flexible Pad Electrode.
1 Cat. No. 1582 Can Motor Grease.
1 Motor and Pump Instructions.

No.		Code	Price
3912B	FISCHER Model "CSWI" Combination Cabinet—with accessories	DAGMR	$665.00
3914B	Cabinet without Motor and Pump and Air Accessories	DAGPS	515.00
4020	FISCHER Model "CSWI" with Separable Base—including accessories	SADMM	680.00
4022	Base only, including all facilities except short wave—also accessories	SADRR	315.00
4024	Base Section only with Facilities for Suction and Pressure with accessories	SADSS	170.00
4026	Base Section only with Facilities for Galvanism, Desiccation, Cautery, Diagnostic Accessories only	SADTT	185.00

FISCHER Ultra-Violet Generators



FISCHER Model "K" Ultra Violet Generator

FISCHER Model "K" Ultra Violet Generator is compact, attractive, mobile—mounted on free-rolling casters. The transformer is placed very low, giving great stability. The reflector is highly polished, backed by moulded bakelite. The cross-arm is instantly adjustable. The upright may be extended to 60". A spring in the upright prevents cross-arm and reflector from jar and possible damage, should it be accidentally released or dropped during adjustment. There is an automatic timer in the transformer housing, also plush-lined pocket for holding and protecting orificial burner. There are two powerful burners, one for orificial use and the large grid-type burner for surface applications. The design of the reflector assures even distribution of the ultra-violet rays over body surfaces. The ultra violet radiation is known as "cold" ultra violet. Only the purest quartz is used. A primary advantage is that the burners do not deteriorate. The spectrogram shows that the rays generated range from 1849 to 3900 AU—with a very great intensity of output around 2550 AU. Naturally output is instant—there is no waiting before application can be made—an important saving of time.

FISCHER Portable Ultra Violet Generator

FISCHER Portable Ultra Violet Generator, in performance. is similar to Model "K". It affords orificial treatments, irradiations of localized skin areas and of more general body parts. It is mounted in a substantial carrying case as shown. Two powerful burners are provided—one for orificial applications and one for localized skin areas or more general body parts. A pure quartz speculum is provided with this portable unit. The reflector is for use in general body radiations. An automatic timer is also a feature.



VIEW ABOVE: Shows orificial and grid-hood burners. One advantage of construction is that grid-hood may be removed from cross-arm and held in any position over patient. Note low transformer and housing which makes for stability.

VIEW LEFT: Shows portable generator. Note two burners, reflector and pure quartz speculum. Applications made with either burner may be either "high" or "low" in intensify.

FEATURES of STRUCTURE - OPERATION

1 FISCHER Ultra Violet Generators are available in two models—the large office or hospital model and the portable model.

2 In both models, the output is more than sufficient for all application needs. Output also remains constant.

3 FISCHER generators have been designed to produce rays ranging from 1849 to 3900 AU. The greatest intensify of output is around 2550 AU.

4 Both the office or hospital generator and the portable generator afford complete ultra violet therapy. Each unit is equipped with two burners.

5 Patient and operator are safe when these generators are operating. There is no possibility of electric shock nor danger from hot mercury.

6 An outstanding advantage in using either of these generators is the saving of time in making applications. Treatment can begin the instant the current is turned on.

7 Flexibility is provided in Model "K" by the adjustable-arm and upright, also by the removable grid-burner. The portable unit is easily carried.

8 Only the finest materials and workmanship are used. The quartz is purest quality.

9 Finish is optional—black, hammered gray or ivory. Various metal parts are in chromium. The portable unit is covered in Du Pont fabrikoid.

10 All H. G. FISCHER & CO. apparatus bears the well-known trade mark—"H. G. FISCHER & CO., CHICAGO, ILL."—within the electric disc. Look for this trade mark. It is your protection.

No.		Code	Price
4370	**FISCHER Model "K" Ultra Violet Generator (Unit without orificial burner—$255.00)**	TATXX	$295.00
4080	**FISCHER Portable Ultra Violet Generator**	TAMPO	160.00
3989	**Quartz Speculum for FISCHER Ultra-Violet Generators**	SACGG	4.50
4382	**Orificial Ultra Violet Burner for use with FISCHER Short Wave Apparatus**	TIBEC	20.00

Ask for descriptive pamphlet Form 1791



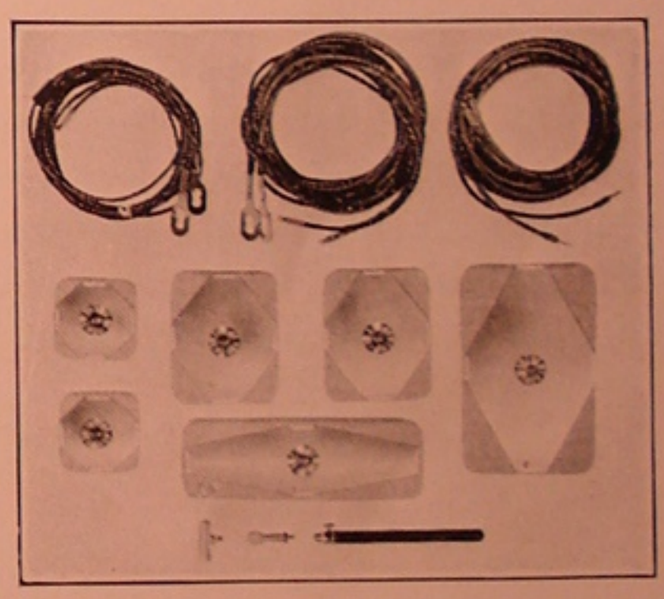
FISCHER Model "J" Galvanic and Contractile Currents Generator

A GALVANIC and contractile currents generator is one of the most widely indicated and most frequently useful units of electrotherapeutic apparatus. This FISCHER Model "J" Generator meets every need and is recommended both by finest performance and remarkably low price.

FISCHER Model "J" Galvanic and Contractile Currents Generator produces all the low voltage currents approved by authorities. The galvanic current is straight line and all contractile currents exact as to wave form—they will remain exact as long as the apparatus is used—due to the heavy, patented flat commutator. Control is exceptionally fine, incomparably in advance of control in former units. Currents wanted are selected by simply turning the two current selector switches to the proper numbers. Whether used for medical galvanism, common ion transfer, or surgical galvanism, this generator will give wholly satisfactory performance.

ACCESSORIES

View above shows new FISCHER Model "J" Galvanic and Contractile Currents Generator. View right shows accessories included with generator—connecting cords, electrodes and handle. Among special features to be emphasized are the following: The current chart on the control panel, giving keys to currents wanted, the quick-reading meters, the slip-proof patient's outlets, the silent operation of the unit. Construction is in every way highest quality. The cabinet is all-steel. A choice of finishes is offered—black Kristokrak, hammered gray, or ivory.

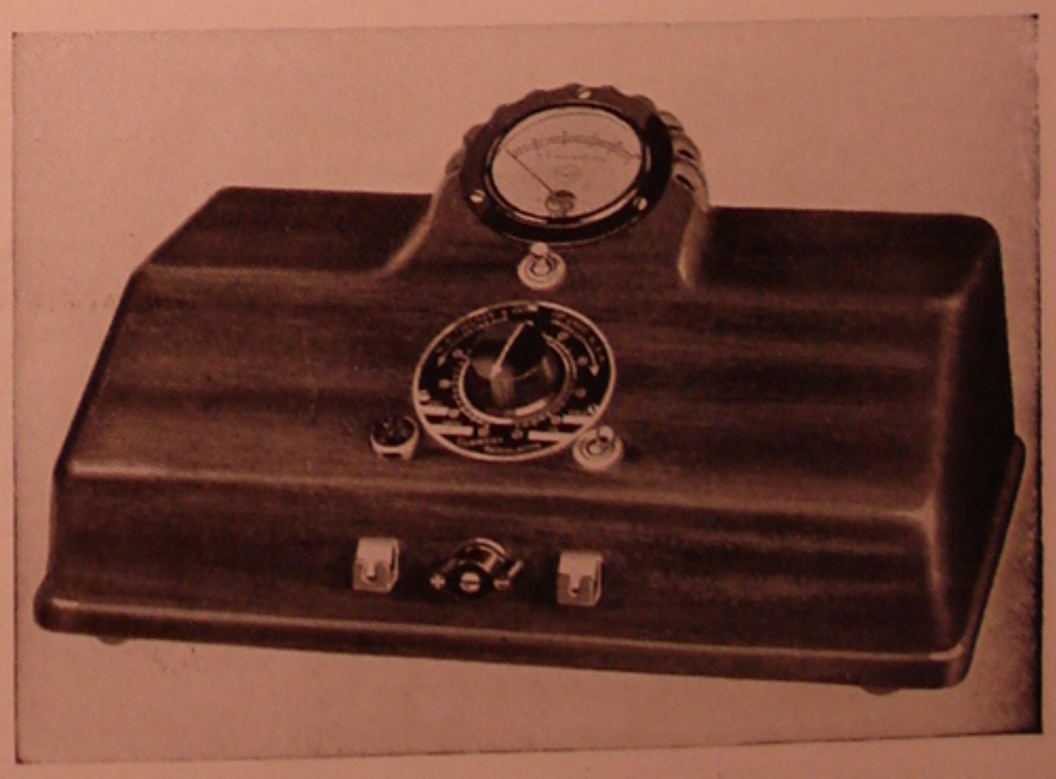


No.	::	Code	Price
4301	**FISCHER Model "J" Galvanic and Contractile Currents Generator with Connecting Cord and Accessories as listed above**	TATAB	$450.00

Ask for descriptive pamphlet Form 1836A

FISCHER Galvanic Current Generator

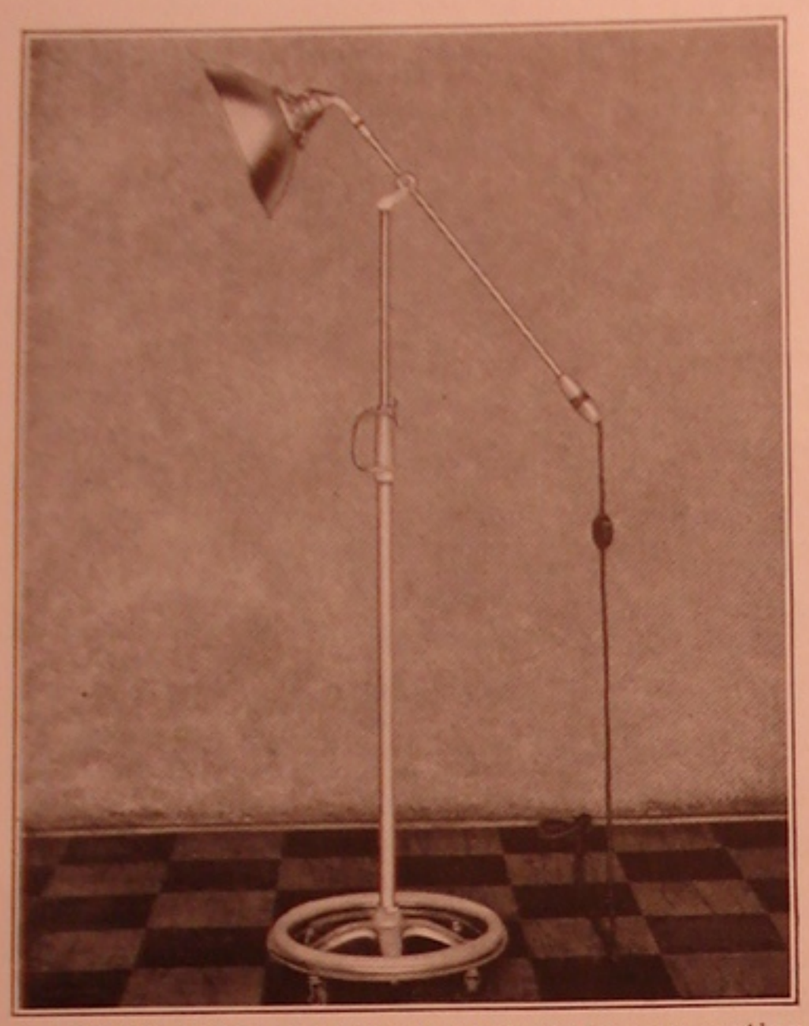
THE extreme importance of the galvanic current in the practice of modern medicine is recognized by the majority of physicians of today, in gynecology, urology, etc., for depilatory work, ionization, rectal lesions, electrolysis, strictures, etc. The outstanding features of this unit are: perfect smoothness of the current; a galvanic output comparable to that of a battery source absolutely without fluctuation; noiseless operation; a polarity switch for pole-changing; a pilot light; black leatheroid finish. The current volume is controlled down to 1/25th part of a milliampere. This means that with this apparatus you can employ galvanism for all of its varied uses without any jerky or painful sensations, a value which will be apparent at once to the physician.



No.	::	Code	Price
2552	**Improved Galvanic Current Generator only (A. C.)**	ZITWY	$115.00
2553	**Special Stand for No. 2552**	GALZE	22.50

Ask for descriptive pamphlet Form 1299F.

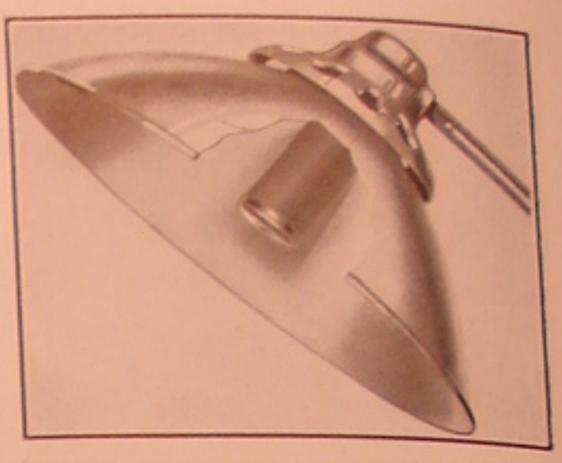
FISCHER Infra-Red Generator



FISCHER Infra-red Generator includes connecting cord for electrical outlet. Switch in cord. Note adjustable upright. Reflector mounting also adjustable, permitting operator to direct rays at will. Convenient handle for moving or carrying. Finish is beautiful ivory. Reflector, polished aluminum.

MADE in two styles—regular model as shown in large illustration and model with faceted reflector (lower right). Base and standard are the same in both models. The stand is adjustable, also arm carrying reflector. Reflector may be raised to over 6 ft. from floor or lowered to within 2 ft. of floor. Diameter of reflector, 11 inches. Weight of reflector is accurately counterbalanced. Base mounted on free-rolling casters. No. 4225 has special bakelite-covered hood, retaining coolness.

The heating element used in this generator is durable, will not flake. The deep, penetrating infra-red rays are produced, rather than visible rays. May be had in either 200 or 400 watt sizes. Unscrews for replacing.



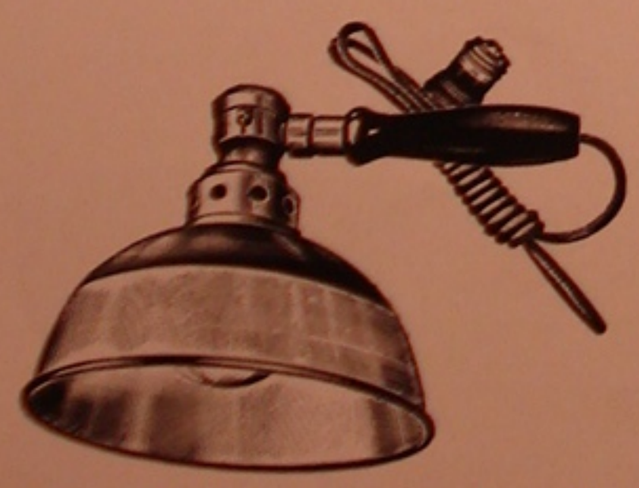


At top: View of heating element. At bottom: Generator with faceted reflector. Finish, black.

No.		Code	Price
4225	FISCHER Infra-red Generator with bakelite covered hood	TEDEF	$32.50
2281	FISCHER Infra-red Generator—Regular Reflector—400 watt element	NEWRE	27.50
4039	FISCHER Infra-red Generator—Faceted Reflector—200 watt element	TAFFA	28.00
4040	FISCHER Infra-red Generator—Faceted Reflector—400 watt element	TAGAB	28.00
2282	400 watt Infra-red Element	ELRED	4.00
2284	200 watt Infra-red Element	ZECUX	4.00

Replacement charge on Infra-red Elements $2.00 plus old Element

FISCHER Therapeutic Lamps



Equipped with a highly polished 8½″ aluminum reflector, a 260 watt genuine stereopticon bulb, a standard length cord and attachment plug. Furnished for 110-125 volts only.

No.		Code	Price
4215	8½-inch Aluminum Reflector with bulb, cord, plug and switch—5-inch enameled wood handle	SACXX	$3.00
4216	Table Type same as No. 4215, but provided with a cast iron base, nickel plated upright, upper section of which is flexible tubing adjustable to any position. Height 30 inches	SADAA	5.80
4217	Floor Type same as No. 4216. Height 54 inches	SADAB	6.80
166	128-watt Stereopticon type bulb	HECTI	1.75
167	260-watt Stereopticon type bulb	USOLA	1.00
168	375-watt Stereopticon type bulb	HEGAR	3.70
181	1000-watt clear bulb	UDDER	6.00
183	1500-watt clear bulb	UHASE	8.00
182	1000-watt blue "daylight" bulb	UGRIC	6.50
184	1500-watt blue "daylight" bulb	UHLAN	10.00

FISCHER Model "S-D" Surgical Diathermy Unit



DESIGNED for surgical diathermy or electrocoagulation. It will be found particularly acceptable by physicians who prefer to limit their applications of diathermy to this character of work. The current produced is ground-free, shockproof, and faradism is totally eliminated. The unit is suitable in every way for the heaviest coagulating as well as for the finest work about the eye. The control is so fine that the volume may be gradually brought down to absolute zero.

For tonsillectomies, electrocoagulation in endocervicitis, treatment of hemorrhoids, work about the eye, ear and nose, the removal of surface blemishes, and the like, this unit will prove of the greatest service and convenience. Eye, ear, nose and throat specialists, urologists, gynecologists, proctologists, dermatologists and general physicians, not now equipped with surgical diathermy apparatus, are invited to send for the facts about this new unit. Finish black.

No.	::	Code	Price
2575	With connecting cord, but without stand or accessories	ZETOP	$167.50
2576	Stand	ZEBOT	22.50

Ask for descriptive pamphlet Form 1322A

FISCHER Model "O" Carbon Arc Lamp



THIS UNIT delivers as much Ultra-violet, Visible and Infra-red radiation as any carbon arc lamp now on the market operating on a lighting circuit. Will operate equally well on alternating or direct current. Localizing Cones furnished if desired.

No.	::	Code	Price
2286	Model "O" Twin Carbon Arc Lamp, including 12 "C" Ultraviolet Carbons, 2 pair of Eye Protecting Goggles, Protection Screen and Connecting Cord	TWINO	$59.50
2291	Set of 3 Localizer Cones consisting of the holder with 4-inch opening and the 2 auxiliary cones reducing to 1 inch and 2 inches, respectively.	SETCO	10.00

See page 41 for available carbons.

Ask for descriptive pamphlet Form 1193.

FISCHER "CDDG" Combination



Combines in one compact, handy unit facilities for Cautery, Desiccation, Diagnostic Light, and Galvanism.

Features Are: 1. Cautery current is the finest possible, permitting a continuous increase or decrease of power—no jumps. 2. The desiccation current is especially delicate and suitable for its purpose, high voltage, low milliamperage. Adjustable spark gap. 3. The diagnostic light circuit lights any bulb used for diagnostic purposes. Bulbs can be lighted to desired brilliance, avoiding burnouts. 4. The galvanic current is perfectly smooth, as from battery source. Operation, noiseless. Voltage output ranges from 0 to 100—milliamperage from 1/5 M.A. to 25 M.A. Current reversible. 5. Insulation is highest quality. Outlets are clearly marked and permanent. 6. Necessary accessories. handles. cords, and so on are included with unit. 7. This unit carries the usual strong FISCHER guarantee of satisfactory performance. It will give long years of efficient service.

No.	::	Code	Price
4007	FISCHER "CDDG" Combination with necessary accessories. [Cat. Nos. 301, 305A, 307(2), 335, 3974, 1900, 1901, 1931(2), 690]	TAIJJ	$185.00

Ask for descriptive pamphlet Form 1637



Hawkeye Timer

REGISTERS the length of any treatment exactly. A wonderful aid to accurate timing, particularly valuable when the physician is treating more than one patient at a time. The Hawkeye rings an alarm at the exact moment treatment should end. Frame is of bakelite. Furnished with black or ivory finish.

No.		Code	Price
3917	Hawkeye Timer	DABAB	$5.00

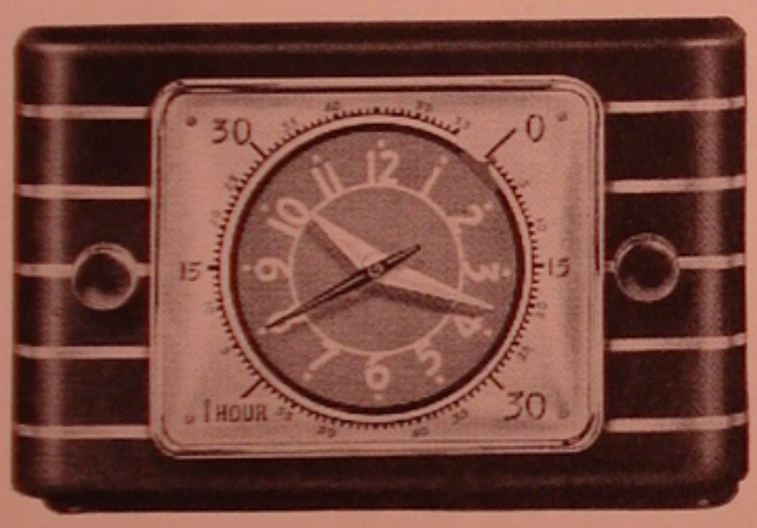


Hawkeye "Measured Time" Electric Timer

ACCURATELY times periods from one second to two hours. On a predetermined minute, gives clear-toned signal, loud or soft, long or short. Conveniently set from the front. A credit to the most attractively appointed laboratory, workroom or office. In rich black or ivory. Alternating current only. Standard 110 volt. 60 cycle. Other cycles special.

No.		Code	Price
2050	Hawkeye "Measured Time" Electric Timer	RIZLO	$9.50

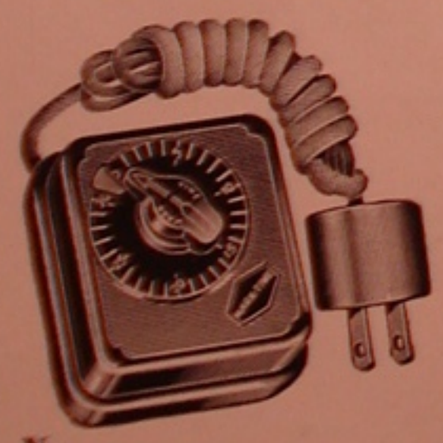
Synchronous Motor-Operated MINUTE MINDER



Provides accurate time and, when required, serves as a reminder at end of preset interval. Records up to 1 hour and 55 minutes. Operated by sturdy self-starting synchronous motor. For 110 volt, 60 cycle, A.C. In the photographic darkroom, an audible signal is repeated every second as long as required. A second hand provides added convenience.

No.		Code	Price
4027	Synchronous MINUTE MINDER, as illustrated	TIBJK	$6.50

Combination Automatic Timer and Cut-Off Switch



HERE is a new automatic timing device that adds the advantage of a cut-off switch. The timer can be set for any period—one to thirty minutes—and when the period elapses the switch automatically disconnects the current. This Automatic Timer and Cut-Off Switch is chrome plated with extension cord for plugging into current outlet. Your machine or lamp plugs directly into the device. The scale is marked in one minute divisions. The base dimensions are 2⅝x2¾ inches. Height, 2¼ inches. When not in use can be hung on machine or lamp or placed in cabinet drawer. Very handy and dependable. Makes treatments convenient. Keeps you from forgetting when time is up.

No.		Code	Price
2626	New Combination Automatic Timer and Cut-Off Switch	ATCOS	$4.95

FISCHER Current Kick-Back Suppressor for Use With Short Wave Apparatus



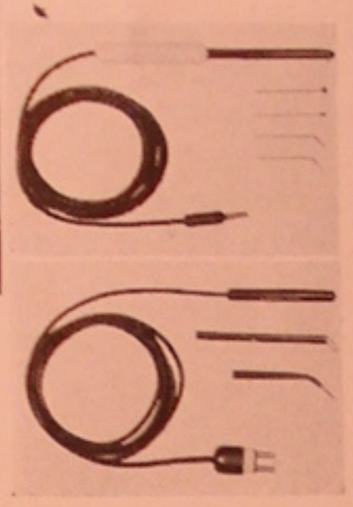
Plugs into line in series with short wave apparatus. Cord attaches to line current outlet. Short wave apparatus plugs into suppressor. Prevents radio disturbance. Protects sensitive electrical equipment attached to power line currents.

No.		Code	Price
4030	FISCHER Current Kick-Back Suppressor	TAGAE	$10.00

FISCHER Dental Coagulator and Desiccator



Above is view of unit, size shown in relation to dental chair — at left views of handles and electrodes used for coagulation and desiccation. Materials and construction are finest quality. Satisfactory performance is guaranteed.



DURING recent years, scientists have made extensive researches for the purpose of determining technics in coagulation and desiccation. They have unanimously agreed that both technics should become integral parts of dental practice. Their recommendations are embodied in the apparatus and electrodes shown in the illustration. The designs are the result of countless experiments and have proved in every way efficient and satisfactory in performance. Results in both coagulation and desiccation are remarkable.

ADVANTAGES

FISCHER Dental COAGULATOR and DESICCATOR consists of the power unit and the coagulating and desiccating electrodes. The electrode tips are sufficient in shape and number to afford access to all parts to be treated. Recommended uses include coagulation in pyorrheic infections, erupting teeth, hyperplastic tissue and so on—desiccation to arrest hemorrhage, for fitting dentures, to produce hyperemia. Full instructions included with unit.

No.	::	Code	Price
3963	FISCHER Dental Coagulator and Desiccator with Electrodes. Ask for descriptive pamphlet Form 1764A	TAMZZ	$110.00

Ask for descriptive pamphlet Form 1764A

FISCHER Inductance Disc and Flexible Arm



THIS disc and arm provide the most convenient of all ways for applying short wave current. Any application in any position can be made. Further, it gives practically all the therapeutic benefit that can be secured from heat.

The disc itself is made of moulded bakelite, also the flexible arm. Friction springs within the arm hold it firmly in any required position. The disc can be turned in any direction.

Actually, this inductance disc and arm is simply a device for holding an inductance cable in pancake form. The cable is continuous within the disc—and replaceable if ever necessary. Adding this disc and arm to your apparatus in no way disturbs use of your present methods of applying short wave diathermy. It is simply an added modality.

No.	::	Code	Price
4434	FISCHER Universally Flexible Arm	TEBAC	$35.50
4436	FISCHER Inductance Disc only	TEBCB	19.50
4432	FISCHER Universally Flexible Arm and Inductance Disc	TEAXY	55.00

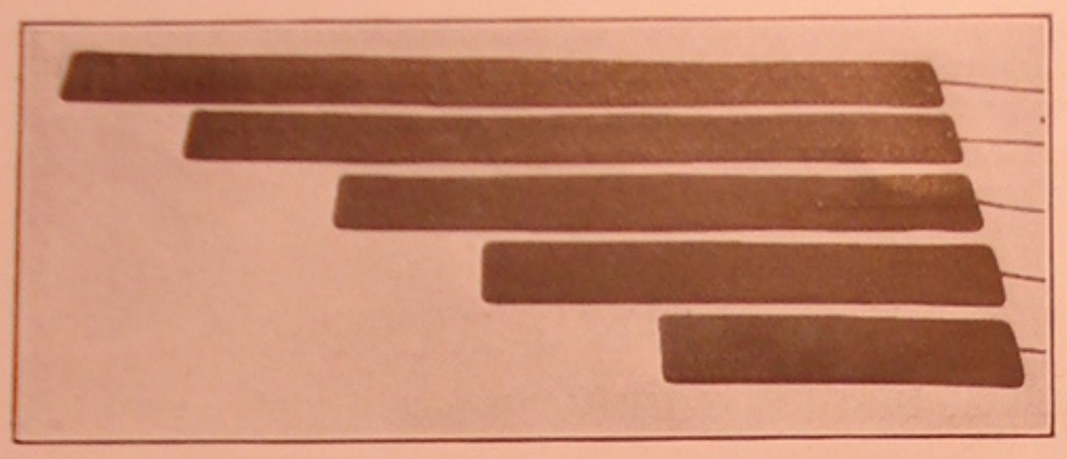
FISCHER Air-Spaced Electrodes



DESIGNED to fit the FISCHER universally flexible arm. Generally used in pairs, although a single air-spaced electrode may be used with an indifferent (pad) electrode. Electrode support made of bakelite. Threads permit varying air-space. Electrode cups are made of lucite. Electrode metal discs are 4″ and 2″ in diameter. Complete air spaced electrode consists of electrode body, two metal discs and connecting cord.

No.	::	Code	Price
4444	Single Air-Spaced Electrode complete to fit FISCHER Universally Flexible Arm	TECAA	$10.00

FISCHER Condenser Electrodes for Short Wave Apparatus Cuff and Pad



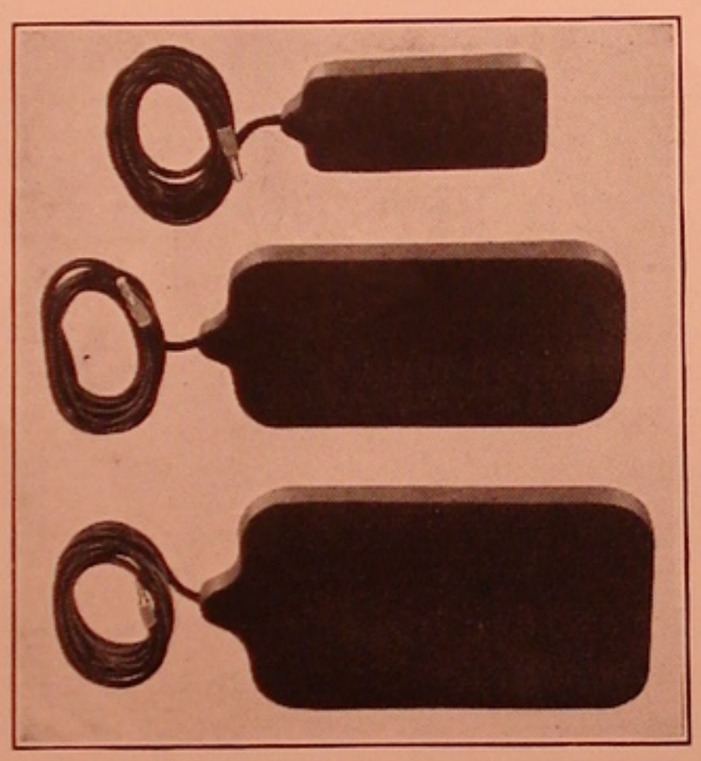
Cuff Electrodes

THESE condenser type cuff electrodes are flexible, intended for wrapping completely around part (trunk for fever). They are made of metal mesh, covered with pliable rubber. Connecting cords are attached. Cuff electrodes are for all purposes. They are especially effective for deep heating and for fever therapy. The most careful laboratory and clinical tests show cuff electrodes to be highly effective in producing results. The list of standard sizes is given below. Any special size will be made to order.

No.		Size		Code	Price
3458	Cuff type	2½" x 12"	Vulcanized	DACOD	$ 2.80
3459	Cuff type	3" x 18"	Vulcanized	DABDY	4.60
3460	Cuff type	3½" x 24"	Vulcanized	DABRE	5.00
3461	Cuff type	4" x 32"	Vulcanized	DABES	7.15
3462	Cuff type	4½" x 40"	Vulcanized	DACOS	9.85
3463	Cuff type	5" x 48"	Vulcanized	DACRY	12.00
3464	Cuff type	8" x 40"	Vulcanized	DACDO	10.00
3452	Cuff type	9" x 48"	Vulcanized	DAZZO	12.50
3453	Cuff type	12" x 40"	Vulcanized	DAYOZ	12.50



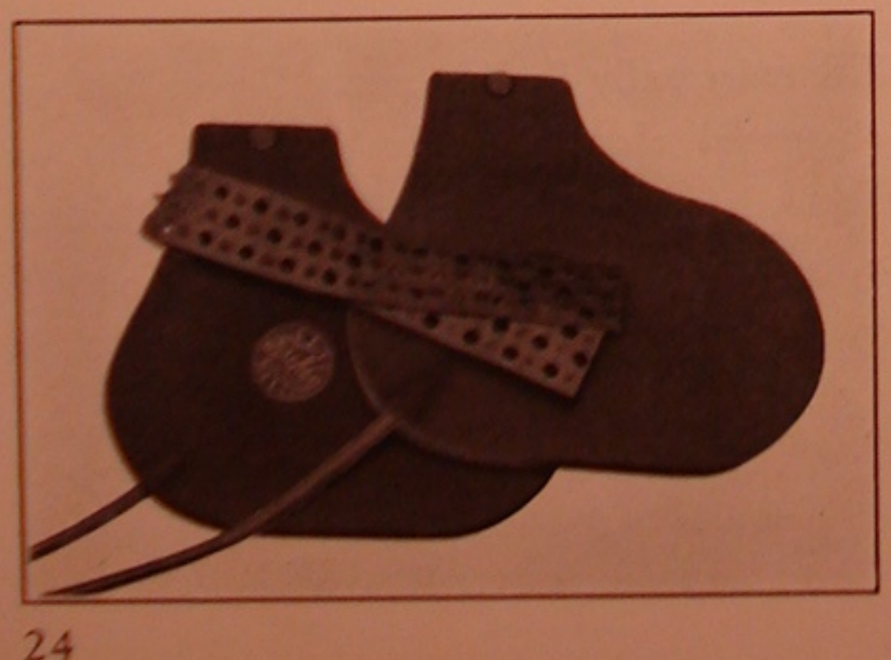




Pad Electrodes

THESE flexible pad electrodes, condenser type, are made of metal mesh, covered with pliable rubber. Connecting cords are attached. Two special variations are shown, for treating sinuses and mastoids. Special sizes of pads, made as above described, are obtainable. The price for any size may be determined by taking $1.25 as a base price and adding 5c for each square inch of size. All materials used in these electrodes are highest quality. These condenser electrodes naturally are used in either short wave or ultra short wave. Toweling or absorbent padding of some type should always be placed between electrode and skin of patient. Padding for use with sinus and mastoid electrodes listed below.

No.		Size		Code	Price
3454	Pad type	2" x 4½"	Vulcanized	FONTA	$2.50
3455	Pad type	4" x 7½"	Vulcanized	FEDES	2.95
3456	Pad type	5" x 8"	Vulcanized	FEELI	3.60
3457	Pad type	11" x 17"	Vulcanized	FEERS	8.25
3599	Pad Type (Mastoid) Vulcanized (includes ½ oz. absorbent padding)			YAGEL	3.50
3598	Pad Type (Sinus) Vulcanized (includes 1 oz. absorbent padding and four lengths of Cat. No. 3570A rubber bandage)			YAAFD	7.25
3597	Absorbent Padding for Sinus Electrode, No. 3598, 4-oz. boxes			EENCY	.55
3596	Absorbent Padding for Mastoid Electrode, No. 3599, 1½ oz. boxes			FENCA	.35

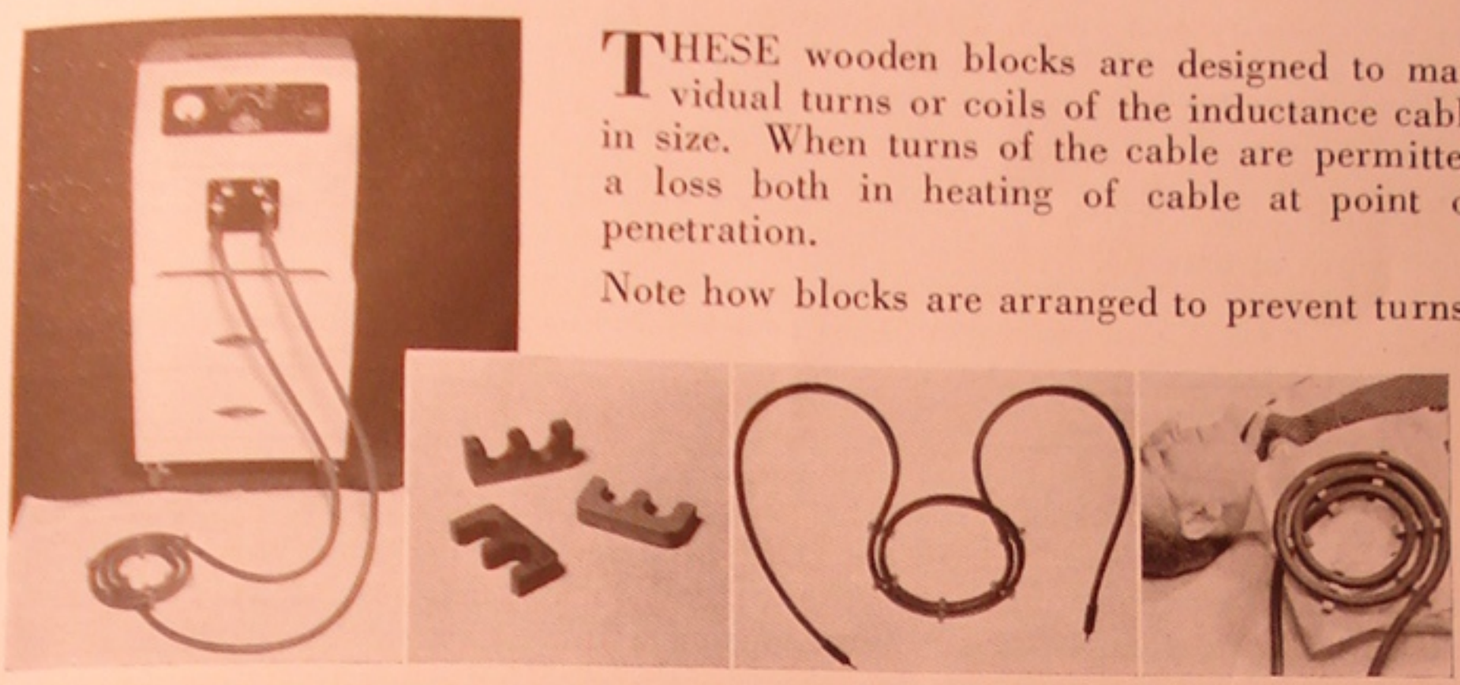


FISCHER Shoulder Pad Electrodes (with Bandage)

THESE are condenser type, pad electrodes, flexible and shaped to use in heating the shoulder. Made of metal mesh covered with rubber insulating composition. Connecting cords are attached. A rubber bandage is included which hooks over moulded "buttons" on the electrodes. Made in only one size.

No.		Code	Price
3898	FISCHER Shoulder Pad Short Wave Electrode—with Bandage—set of two	TAIBA	$8.25

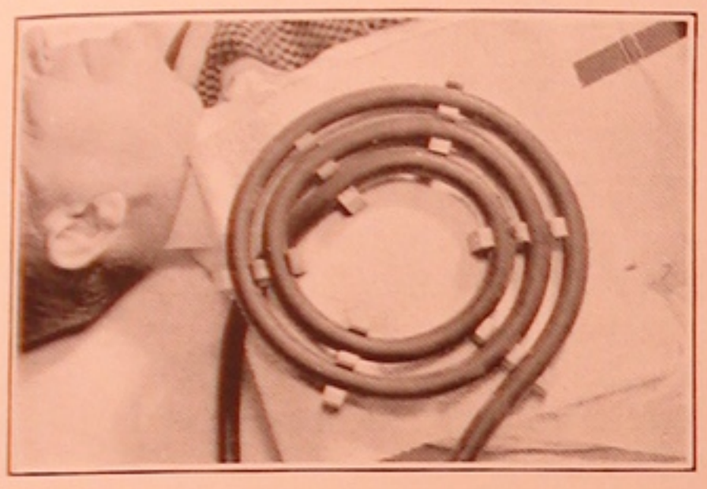
Separator Blocks for Inductance Cable



THESE wooden blocks are designed to maintain uniform air spaces between individual turns or coils of the inductance cable as shown. Coils, of course, may vary in size. When turns of the cable are permitted to touch, there is a loss of efficiency, a loss both in heating of cable at point of contact between turns and in body penetration.

Note how blocks are arranged to prevent turns of cable crossing or touching at any point. Where the inner turn of the cable passes out under the other turns, it is important to so arrange one separator block that contact of cable surfaces is prevented. Separator blocks are available singly or in sets. They provide for one and three-quarter turns or more, as desired.

No.		Code	Price Each
3934	Separator Blocks for Inductance Cable	SACWW	$0.10



Inductance Cable

A SEMI-FLEXIBLE rubber-covered conductor with special-size end attachments to fit into inductance cable outlets on FISCHER Short Wave Apparatus. The large end attachments prevent plugging into wrong outlets. Wraps easily around body, limb, ankle or wrist. Usable as coil on shoulder or other part. Excellent for heating deep-seated areas or for fever production.

No.		Code	Price
3932	Inductance Cable	YAGEI	$14.50

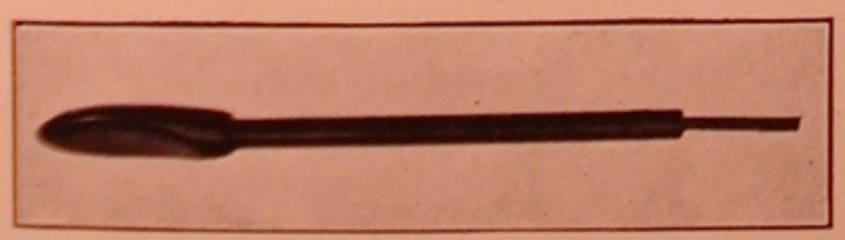
Perforated Self-Locking Rubber Bandage



AN EXTREMELY handy device for fastening condenser electrodes in positions wanted. Note the illustration. Made of pure gum rubber. In use, a slight pull stretches the bandage to the pressure wanted and the small protuberances drop into the perforations, holding firmly. No tying. No buckling. A time saver.

No.		Code	Price
3570	Perforated Self-Locking Rubber Bandage (40″ Long)	TREFO	$0.75
3570A	Perforated Self-Locking Rubber Bandage (18″ Long)	JACMY	.40

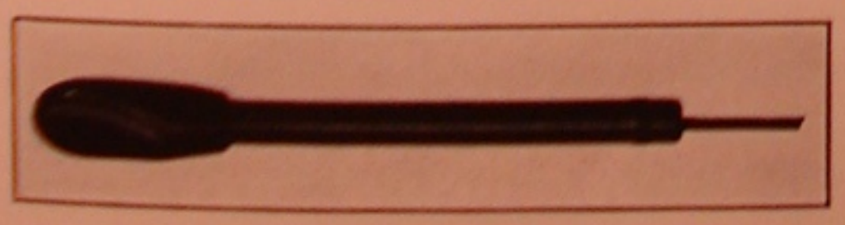
Molded Bakelite Prostatic Electrode



THIS electrode is made in two sizes—of pure molded bakelite over metallic core. Cord attached. Scientifically shaped for its purpose. May be sterilized. Large size, 1″ wide, 3″ long, on 7″ insulated shaft. Small size, ¾″ wide, 2¾″ long, on 7″ insulated shaft.

No.		Code	Price
3844	FISCHER Bakelite Molded Prostatic Electrode—large size	JUKOL	$12.00
3846	FISCHER Bakelite Molded Prostatic Electrode—small size	IAFDE	12.00

Molded Bakelite Vaginal Electrode

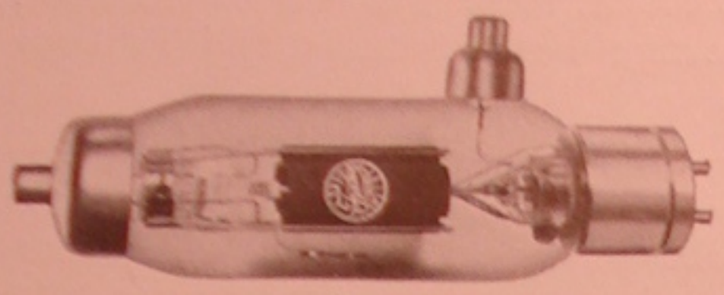


MADE in only one size—as shown. Molded of pure bakelite with connecting cord attached. Scientifically shaped for its purpose. May be sterilized. Width 1⅝″, length 3″, on 7″ insulated shaft.

No.		Code	Price
3845	FISCHER Bakelite Molded Vaginal Electrode	JUKLA	$12.00

FISCHER Tubes for Short Wave Apparatus

Each FISCHER Custom-Built Tube is individually processed. Some have anodes of carbon, some of tantalum. All FISCHER Tubes are guaranteed for six months against defective materials or workmanship. The following Cat. Nos. list the units of FISCHER apparatus for which FISCHER Tubes are suitable.



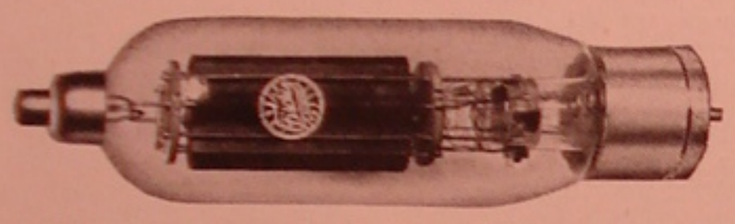
This FISCHER Tube, No. 3580, is for use only on FISCHER Model "USW-6B" short wave apparatus.

No.		Code	Price
3580	FISCHER Power Tube	YAAEX	$21.50



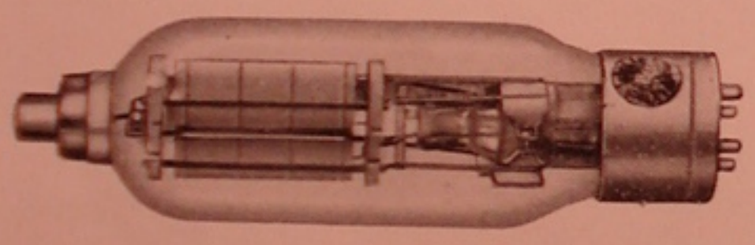
No. 3581, for use on FISCHER Models CSWI, "SWI-12," "SWDI-12," "SWDI-18," "SWDI-24," also FISCHER Models "SW-17" and "SW-24A." In certain short wave applications, the tubes are required to deliver a small amount of power. In other instances, where a large area of the body is to be treated for a high temperature rise, the tubes are called upon to deliver a great amount of power. This tube has a high safety factor, thus eliminating loss of emission in the tube while operating at any level up to full capacity. Note the skyscraper construction; the sturdiness of the large carbon anode and the greater emitting surface in the filament.

No.		Code	Price
3581	FISCHER Power Tube	HITAY	$18.50



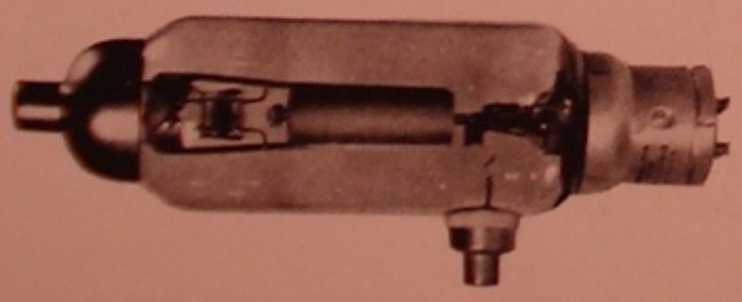
No. 3593, for use on FISCHER Models "C," "SW-12," "CSW," "SW-12" (Portable) and "USW-9A." A medium powered tube. Its characteristics are such that optimum efficiencies can be realized at all loads. The extremely low inter-electrode capacities and its rugged oversize elements and leads, enable it to be subject to severe overloads. Tubes used in short wave equipment must be capable of standing severe overloads and yet insure long life. A tube of this caliber can only be produced by a concern thoroughly familiar with short wave equipment and its requirements.

No.		Code	Price
3593	FISCHER Power Tube—New heavy plate type	DAGOA	$18.50



The unusual electrical characteristics account for the fine performance of this tube. The anode is fabricated from completely de-gassed TANTALUM. The use of this expensive material for the anode prevents the tube from becoming gassy due to operating overloads.

No.		Code	Price
4440	FISCHER power tube—tantalum anode—for use in Fischer Model "M" and "S", "R" and "PR" Short Wave Units	TEBDC	$20.00



For use on all FISCHER 6-meter short wave units excepting FISCHER Model "USW-6B", designed to give high efficiency at high frequencies. Elimination of ceramic insulators between grid and plate connections have eliminated power losses within the tube. Extra heavy grid leads and plate leads to withstand the terrific amount of radio frequency heat that is generated at high frequencies, are used. We incorporate the use of a tantalum anode which dissipates the heat of the tube and also gives the tube a larger safety factor to be able to withstand generous overloading.

No.		Code	Price
4195	Heavy Duty Power Tube—tantalum anode—for use with all FISCHER 6-meter short wave units. excepting FISCHER Model "USW-6B"	TAOBC	$26.00

FISCHER Rectifying Tube for Short Wave Apparatus



NO. 3572A, for use on all FISCHER short wave and ultra short wave outfits. This is a reliable, heavy-duty, half-wave, mercury vapor rectifier, capable of withstanding high inverse peak currents and voltage. Constructed sturdily of the highest quality material and workmanship. The filament is of the ribbon type giving larger emitting surface. WARNING: In transit, mercury in tube splatters over filament—therefore, when first placing this tube into operation, filament should be lighted for fully 15 minutes to allow mercury to condense to bottom of bulb.

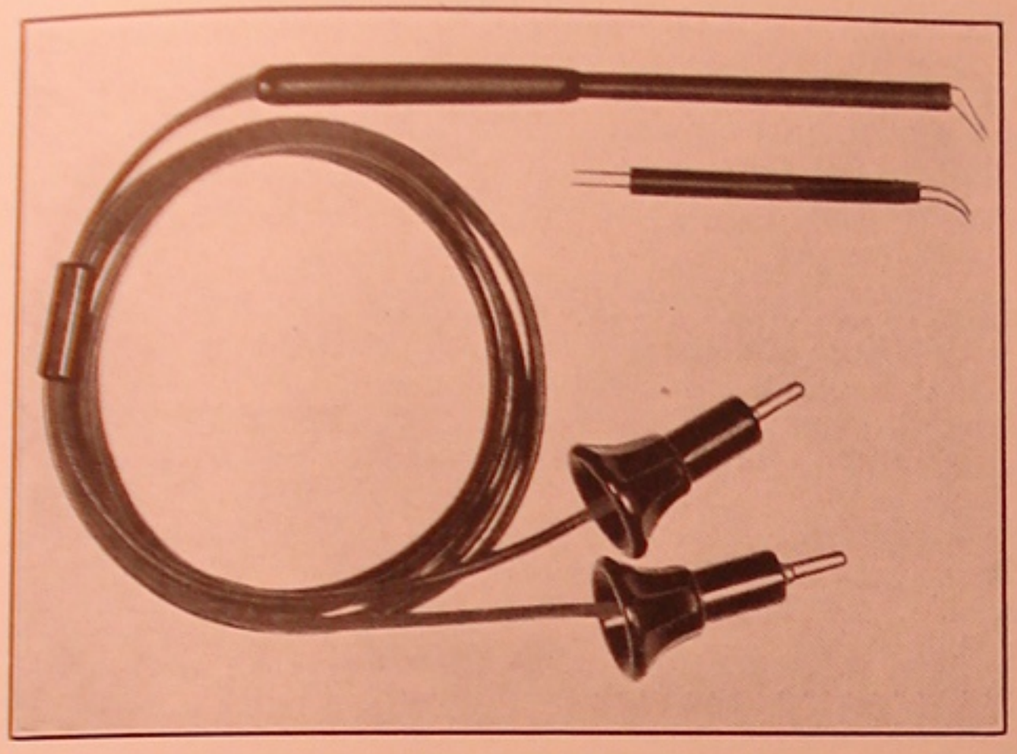
No.		Code	Price
3572A	FISCHER Rectifier Tube	FRIGI	$1.50

WILIMAC Calibrated-Dosage Coagulating Electrode

IN coagulation in endocervicitis, this electrode gives definite control of the length, width and depth of the coagulation—an exclusive feature. Calibration indicates correct dosage for each case. Assures uniform results. Permits of a technic free from scar tissue or stenosis. The only flat-sided electrode. Needs no special manipulation. Just lay it flat against cervical wall. Auxiliary tips are for cysts, erosions, tonsils, moles, epitheliomas and such.

No.	::	Code	Price
3965	WILIMAC Calibrated-Dosage Electrode for Endocervicitis	SACPP	$20.00
3966	Same as above with tips for cervical canal and cysts and erosions only	TALBA	14.50

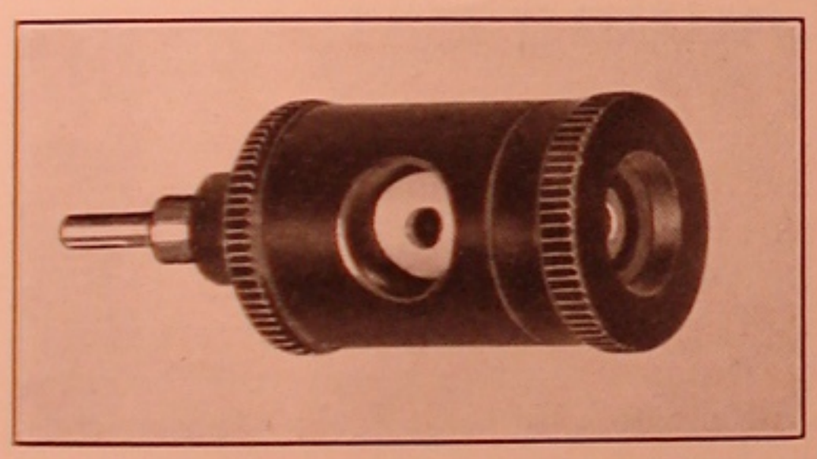
WILIMAC Dental Coagulating Set



MADE with handle, connecting cord and two tips as shown. Coagulation takes place only between gold needles on tips. Needles are fine and flexible. Intended for coagulating in pyorrhea. Design permits operator to reach any part of mouth, between teeth, down to pus pockets. Minimum destruction of healthy tissue. Electrode is not boilable—must be sterilized by cold methods. Can be used with either diathermy or short wave machines. With the latter, the surgical cutting attachment is necessary. (No. 3960 See Page 31.)

No.	::	Code	Price
3964	WILIMAC Dental Coagulating Set—handle, cord, two tips	SACCO	$15.00

Multiple Connector for Short Wave Apparatus



USABLE when it is desirable to apply two condenser electrodes from the same terminal. Designed and insulated for short wave current.

No.	::	Code	Price
3976	Multiple Connector for Short Wave Apparatus	TAIHG	$2.35

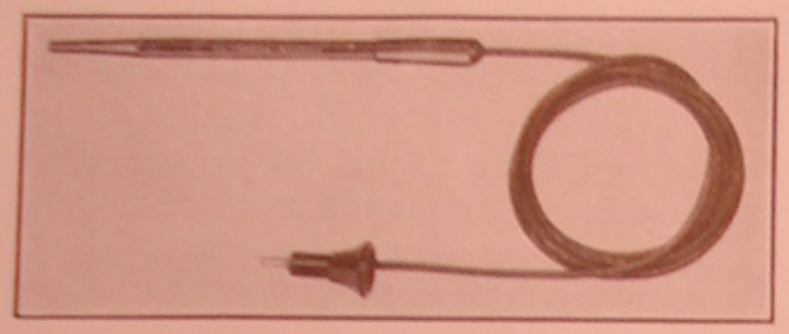
FISCHER-RANTOS Fever Bag



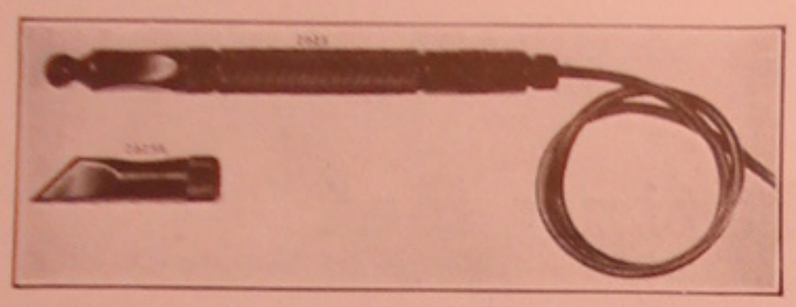
ESPECIALLY designed for use in fever treatments; allows the patient complete freedom of all body movement. The bag is constructed and insulated so that no temperature changes occur, and is a decided advantage over wrapping and restricting patients with blankets. Length, 78″; width, 45″; weight, 17 lbs. Lining: hollandex—a rubber calendered waterproof fabric, easily sterilized, long wearing Insulation: No. 1 prime kapok. Outer covering: waterproof drill, durable, easily cleaned. Color: field green.

Locking type talon fastener from neck to bottom of bag and across bottom allows for easy accessibility either for cleaning or patient. A lock type zipper (20″) at the rear of the bag allows easy accessibility to patient without opening the entire side thereby losing generated heat. Foot and sides of bag built up approximately 8″. All zippers are protected by insulated flaps. The heat cannot escape when the zippers are closed. Collar, Russian style, fits closely the neck of the patient; it can be adjusted to any size. Foot and sides built to take weight of bag off patient. Rantos Fever Bag, special, has non-metallic fasteners, additional terry cloth blanket, 78x90, and leather carrying straps.

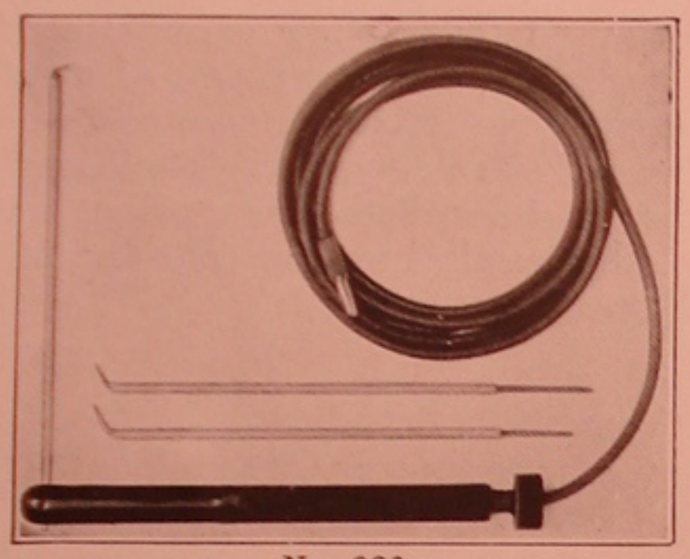
No.	::	Code	Price
3936	FISCHER-RANTOS Fever Bag	SADJJ	$54.50
3937	FISCHER-RANTOS Fever Bag, Special	TAIXY	59.50



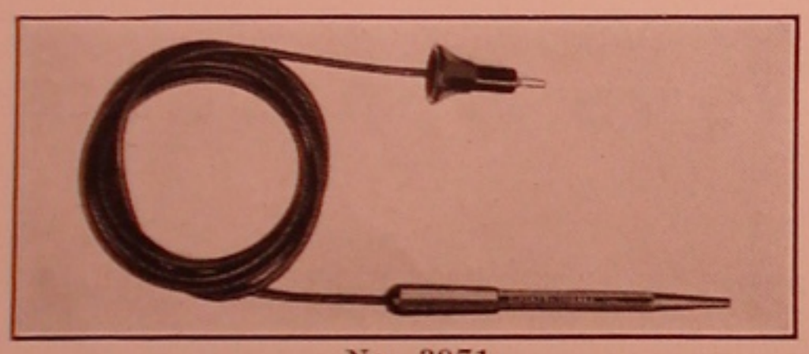
No. 3970



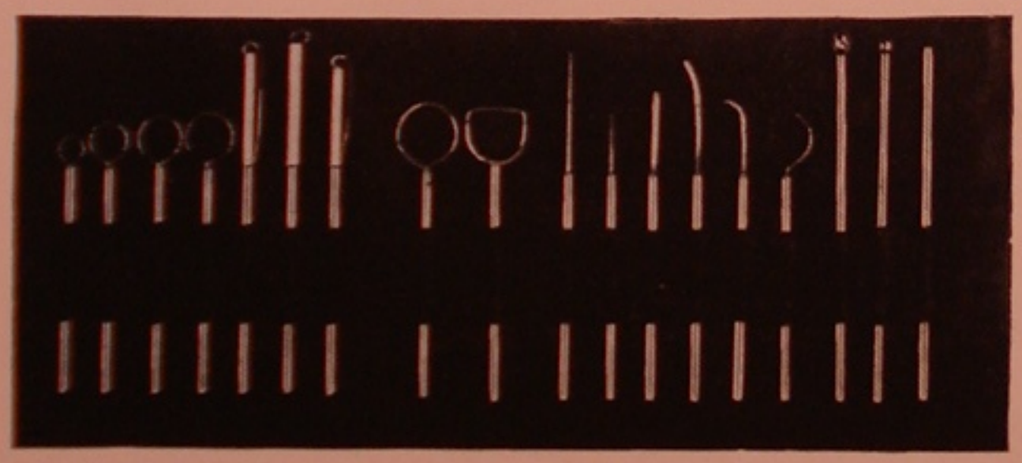
No. 2825



No. 920



No. 3971



FISCHER Electrosurgical Handles (Electrodes)

THESE handles are designed specifically for tonsillectomies and other electrocoagulations. They are light in weight, and exceptionally handy—operator's hands out of line of vision. A very flexible rubber-covered cable is securely fastened directly into the polished hard rubber handle, and is sufficiently insulated that it may be wound around the hand and arm, or allowed to lie against the face of the patient with positively no danger of shocking. There is no exposed metal anywhere, with the exception of the active tip. Tips of different lengths are furnished, as illustrated. Important points to note are—

1 The DILLINGER handle is designed for straight position only. Inside chuck holds electrode firmly. No turning. Octagonal for easy holding. Die-molded of pure black bakelite. Length 8 inches. Boilable.

2 The Sinskey handle is constructed with an interchangeable tip affording 45 and 90 degree angles for the coagulating electrodes.

3 The Knotts handle affords right angle position. In cross section, shape is rectangular to aid holding. Heavily knurled on sides. Made of hard rubber.

No.	::	Code	Price
3970	The Dillinger Handle	DAGRT	$5.00
3972	No. 3970 Handle with Three Electrodes	DAHAO	7.50
2846	Gross Coagulating Set. Handle No. 3970, and three electrodes, 1 straight, 1 angular, 1 curved	FERRA	7.50
2825	The Sinskey Handle and separate tips. 1—45°, 1—90°	SIHDL	7.50
920	The Knotts Handle and Three Electrodes	WAYLA	10.00
3974	FISCHER Short Wave Coagulating Set—consisting of No. 3970 Handle, No. 2847 Angular Ball Point, No. 2431 Straight Ball Point, and No. 736 Straight Needle	SABZY	7.50

FISCHER Electrosurgical Tissue-Cutting Set

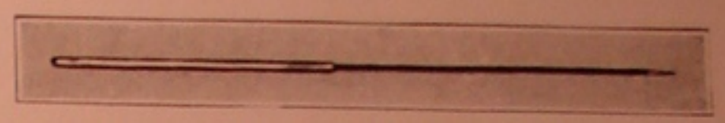
THIS set of loops, knife blades, needle points, reamers and coagulating balls with special handles, has been designed for electrosurgical tissue-cutting. The handle is separable for sterilization (boiling), and has a chucking device which prevents the cutting instrument from turning during operation. The set of cutting instruments is sufficiently complete for almost any operative purpose. The complete set is mounted, as illustrated, in a holder. Instruments may be purchased individually as indicated below.

No.	::	Code	Price
3971	FISCHER Electrosurgical Tissue-Cutting Handle, with insulated cord	DAGSU	$5.00

Instruments Are Listed in Order as Illustrated

No.	::	Code	Price
792	¼" Loop Cutting Electrode	WRAIT	$0.80
794	⅜" Loop Cutting Electrode	WIZAR	.80
796	½" Loop Cutting Electrode	WIZEN	.80
2421	⅝" Loop Cutting Electrode	ZATUL	.75
2436	Cervical Reamer (side cutting, short)	ZIYAL	2.40
2426	Triangle shape Cervical Reamer	ZAZDA	2.40
2427	Side cutting Cervical Reamer, with insulated tip	ZIZAD	2.40
2420	7/16" Loop Cutting Electrode	ZATOK	.80
2425	Square End Cutting Loop—9/16" blade	ZIHIG	2.20
799	Needle Point Cutting Electrode—1¼"	WOMBA	.80
2424	Needle Point Electrode—⅝"	ZIRTY	.80
2423	Straight Knife Electrode—1" blade	ZAUSK	1.00
797	Saber-shape Knife Electrode—1 3/16" blade	WOLVE	1.00
2422	Saber-shape Knife Electrode—¾" blade	ZAUDT	1.00
798	Curved Knife Electrode—5/8" blade	WOLFR	1.00
2432	Coagulating Ball—1/16" diameter	ZIDZA	.65
2430	Coagulating Ball—1/8" diameter	ZAUCS	.65
2431	Coagulating Tip—3/32" diameter	ZIANK	.65
2440	Complete set of 18 Loops, Knife Blades, Needle Points, Reamers and Coagulating Balls, as above, in cloth holder to fit either No. 3970, 3971 or 2825 handles	ZAVOL	20.00

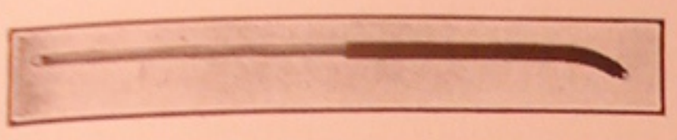
BECK-GUTTMAN Turbinate Coagulating Needle



THE needle is first inserted into the entire depth of the turbinate, the current is turned on for a moment and the needle withdrawn a short distance. This is repeated until the entire length of the turbinate is coagulated. It is well to make a special effort to coagulate the mucosa where the needle was inserted, just before withdrawing it entirely. This is to prevent any possible bleeding from the needle puncture.

No.		Code	Price
2449	Beck-Guttman Turbinate Coagulating Needle (arranged for use with Nos. 3970, 2825, 3971 Handles)	ZIMIL	$1.00

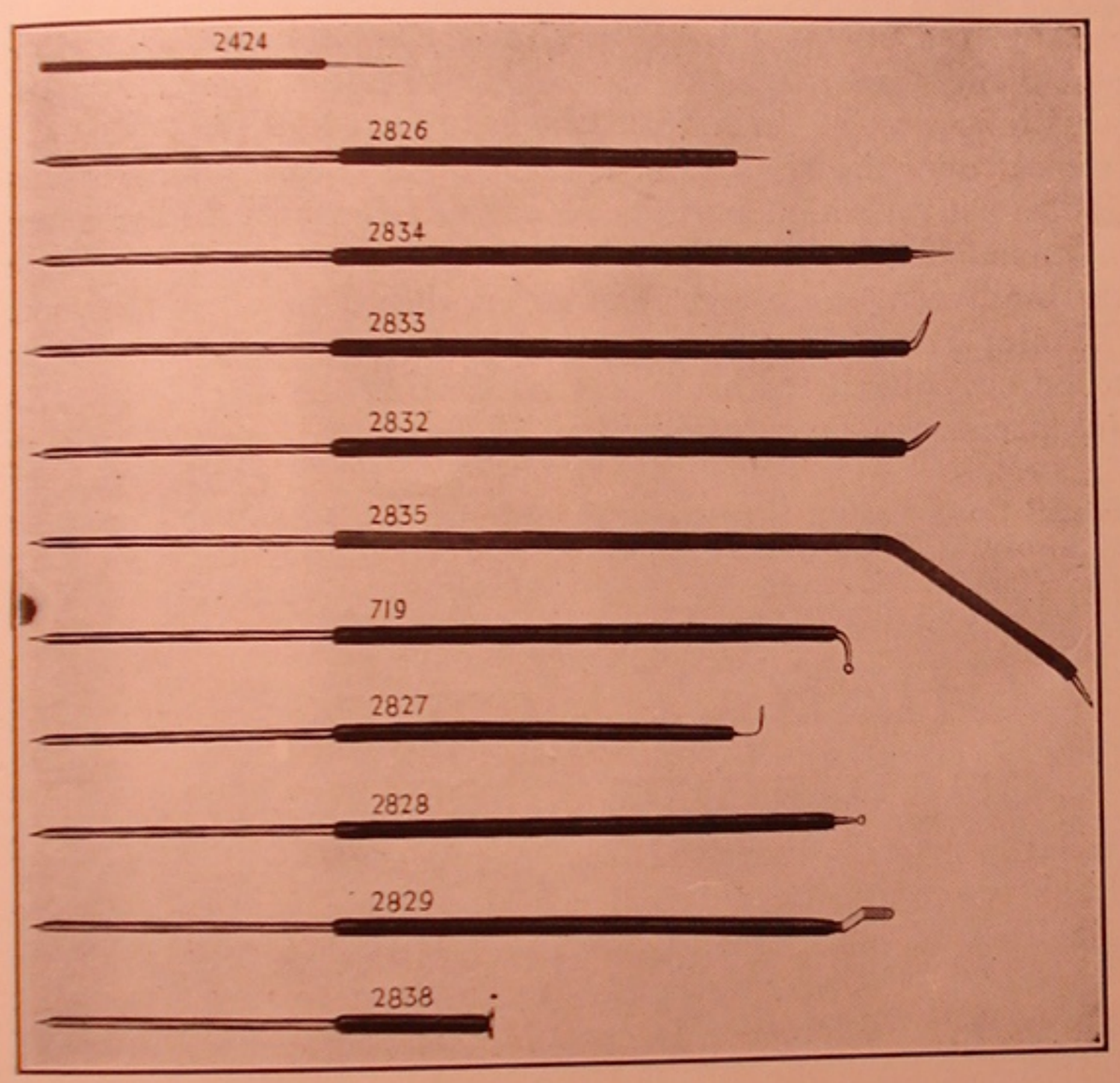
GROSS Short Wave Coagulating Electrode



MADE of rustless instrument steel with bulbous point for use in short wave electrosurgery (coagulation). The rubber insulation is movable to expose more or less of the coagulating tip.

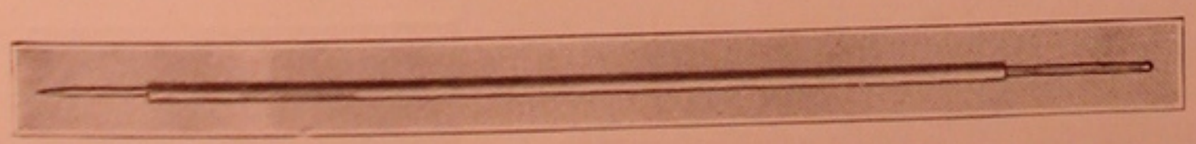
No.		Code	Price
2847	Gross Short Wave Coagulating Electrode (Ball Tip)	TOTER	$0.85
741	Special Gross Type Needle to fit DILLINGER handle. Active tip bent, 60° angle (sharp point)	GRODI	.85
2848	Gross Revolving Ball Short Wave Dehydrating Electrode	SADHH	1.25

FISCHER Electrosurgical Electrodes

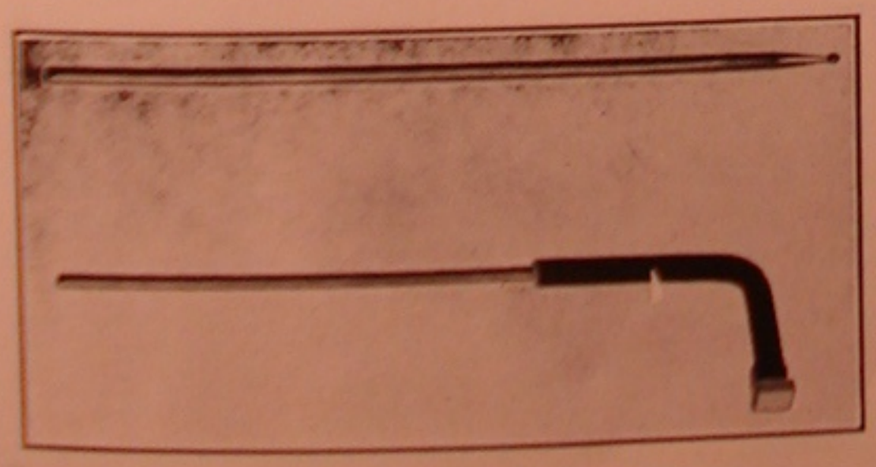


THE eleven electrodes illustrated are for all manner of electrocoagulation purposes. They are rustproof and well insulated. In the illustration the electrodes are reduced somewhat more than half actual size. Only the best materials are used.

No.		Code	Price
2424	Straight, Short Needle. No insulation	ZIRTY	$0.80
2826	Needle Point Electrode. Bakelite insulation	SINEE	1.00
2834	Long Needle Point. Bakelite insulation	SISTR	1.00
2833	Sharp Point Electrode (45° angle). Bakelite insulation	SIANG	1.00
2832	Sharp Point Electrode (60° angle). Bakelite insulation	SIARP	1.00
2835	Extra Long (double angle). Soft rubber insulation	SIDOU	1.00
719	Long Needle, Curved Tip, Ball Point. Soft rubber insulation	COHLO	1.50
2827	Right Angle, Flat Tip. Bakelite insulation	SITIP	1.50
2828	Medium Length, Ball Tip. Bakelite insulation	SIBAL	1.00
2829	Offset Flat Tip. Bakelite insulation	SIOFF	1.00
2838	Short Shank (¼" slightly concave face). Bakelite insulation	TOREK	1.00



863	Special Long Coagulating Needle of polished aluminum wire. May be bent as desired. Insulated as shown	NORNE	1.00
2604	SINSKEY Nasal Polyp Electrode—very sharp point	FLORE	1.50



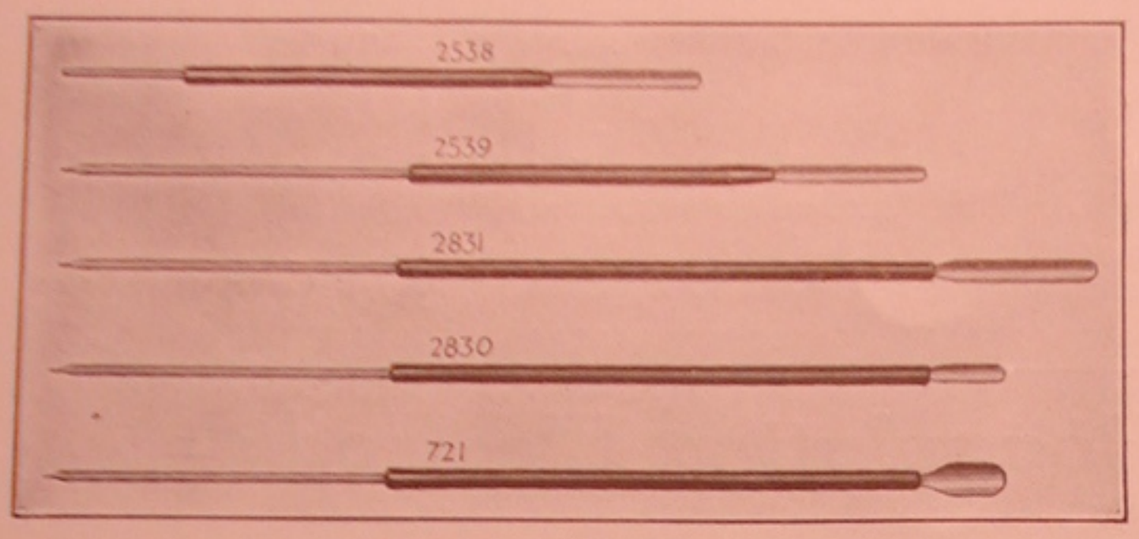
Top—No. 2431 Bottom—No. 2085

THOREK Electrodes for Cholecystelectrocoagulectomy

DESIGNED by Max Thorek, M. D., for his special Cholecystelectrocoagulectomy operation. For details ask for reprint Form 1429.

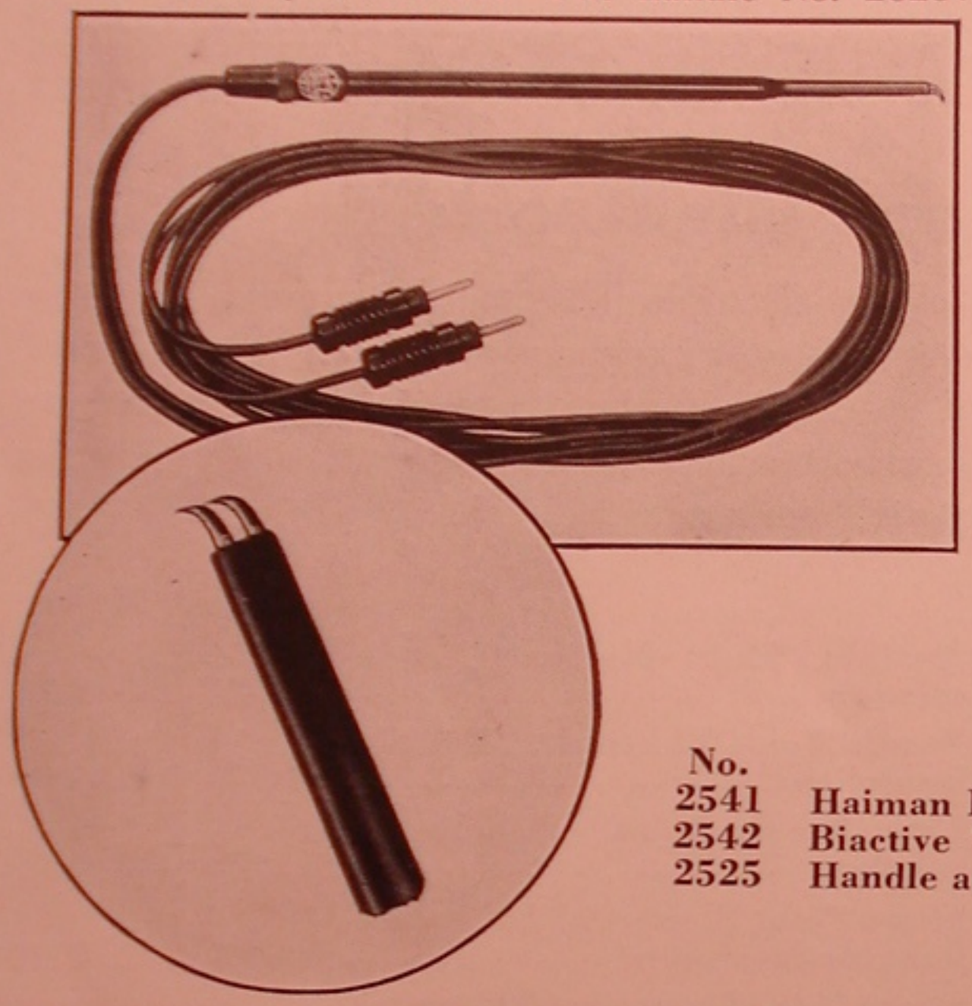
No.		Code	Price
2085	3/16" Square End. Soft rubber insulation	OXOCC	3.00
2086	1/4" Square End. Soft rubber insulation	OLIVA	3.00
2087	5/16" Square End. Soft rubber insulation	OEDEM	3.00
2088	3/8" Square End. Soft rubber insulation	OESOP	3.00
2431	Coagulating Ball (3/32" diameter). No insulation	ZIANK	.65

SINSKEY Turbinate Electrodes



DESIGNED for the purpose of applying the Sinskey technic of turbinate shrinkage. Complete reprint giving technic furnished on request. The purpose is to generate heat in the tissues to a point short of tissue-destruction (coagulation). The electrode used is a gutter shaped piece of non-rustable metal, insulated with bakelite.

No.	::	Code	Price
721	Sinskey Electrode (with short, broad surface). Fits handles Nos. 3970, 3971 and 2825	SIOAD	$1.75
2539	Sinskey Electrode. Fits handles Nos. 3970, 3971 and 2825	ZIGAC	1.50
2830	Sinskey Electrode. Fits handles Nos. 3970, 3971 and 2825	SIORT	1.50
2831	Sinskey Electrode. Fits handles Nos. 3970, 3971 and 2825	SIONG	1.30
2538	Sinskey Electrode. Fits handle No. 2825	ZANAZ	1.50



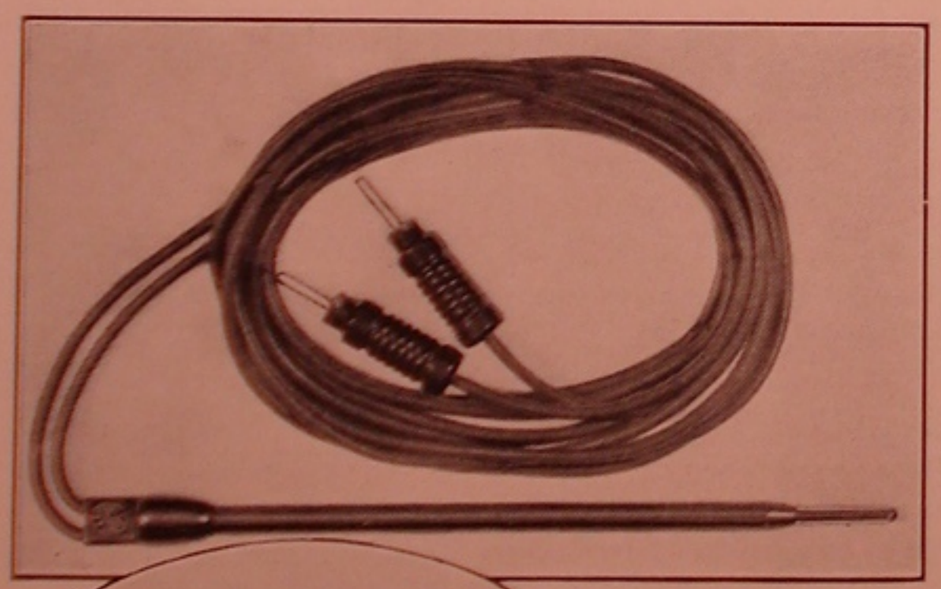
HAIMAN Biactive Tonsil Coagulating Electrode

J. A. HAIMAN, M. D., New York City, employs a method that is based on the use of a Bipolar Tonsil Electrode which is self-contained, being constructed with two active curved needle electrodes which project ¼ inch from the insulated holder.

These electrodes are set 2 mm. apart. Such construction renders both needles active, which permits of coagulation only in the space between them. This method eliminates the necessity of the large block tin indifferent plate electrode as employed in other methods.

The Bipolar Tonsil Electrode can be used to pick up the tonsilar tissue to be coagulated, with the advantage that the double needles make this procedure considerably less difficult.

No.	::	Code	Price
2541	Haiman Biactive Tonsil Coagulating Electrode, complete	ZEEPH	$12.50
2542	Biactive Tonsil Tip, only	ZEERK	7.50
2525	Handle and Cord for Biactive Electrode	ZEENG	5.00



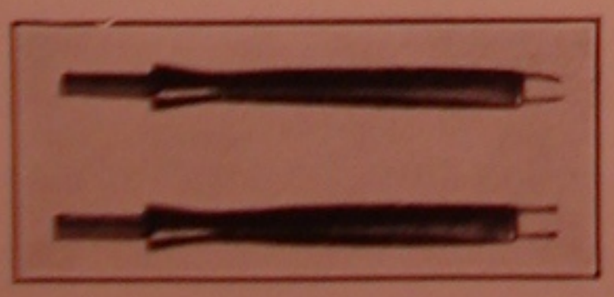
CHERRY Cervical Coagulating Electrode

A BIPOLAR electrode designed for coagulating and destroying glandular tissue in the cervical canal. Made of highly compressed bakelite and monel metal. Active electrode or tip is removable and boilable. Connecting cords are fastened to and form part of electrode proper. Electrode is complete in itself—no indifferent plate required—making the application simple. Positively shock-proof.

The purpose of this electrode is to achieve uniform destruction of glandular tissue throughout the entire length of the cervical canal at one treatment



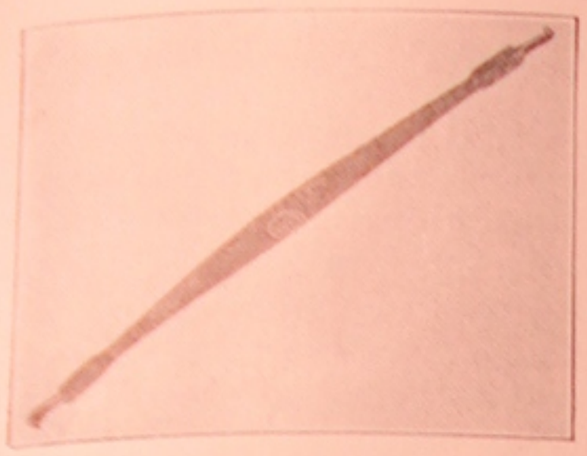
No.	::	Code	Price
2526A	Cherry Cervical Coagulating Electrode, complete	ZEMDA	$12.50
2527	Biactive Tip, only, for Cherry Electrode	ZEFIX	7.50
2525	Handle and Cord only, for Biactive Electrodes	ZEENG	5.00



FISCHER Bipolar Puncture and Coagulation Electrode

FOR use in connection with Handle No. 2525. Made of bakelite. Boilable. Tips stainless steel.

No.	::	Code	Price
2556	Sharp-pointed Bipolar Puncture Electrode	YAFVA	$5.00
2558	Ball-pointed Bipolar Coagulator	BALBI	5.00



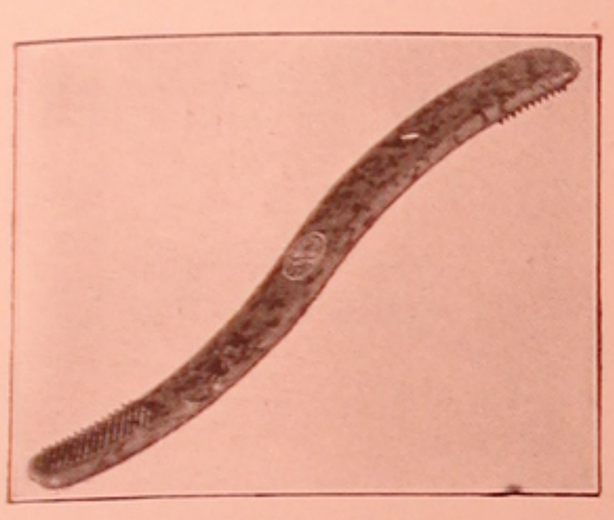
GROSS Pillar Retractor

MADE of pure bakelite, practically indestructible. *Boilable.* The design is very neat and strong, oval and broader in the center for easy grip and so that the operator knows the position of the tips. The metal tips, of two sizes and shapes, are copper, chrome plated. They are properly shaped and will not injure the pillars.

No.		Code	Price
2531		ZIJOJ	$3.25

Glass Pillar Retractor, Double End

No.		Code	Price
922	Double End Pillar Retractor (pyrex glass)	ZAVUM	$1.50



DILLINGER Tongue Depressor

MADE of pure bakelite. Indestructible. *Boilable.* One end is somewhat narrower than the other. The shape of this depressor has been carefully designed so that the hand is out of the line of vision of the physician when either end is used. Corrugations are molded into that part of both ends which come into contact with the tongue.

No.		Code	Price
2536	Bakelite Depressor	ZIJYL	$2.10

FISCHER Electrocoagulation Foot Switch



No. 1498

AS ILLUSTRATED, this Foot Switch lies close on the floor. A touch of the toe makes and breaks the contact. It is molded of bakelite with sufficient insulation to make it shockproof. It is easily moved about, yet keeps an upright position on the floor. The cable is flexible and covered with pure gum rubber; it may be washed and kept as new always. Cable terminals will be furnished to fit any style apparatus; specify machine used, when ordering.

No.		Code	Price
1498	FISCHER Electrocoagulation Foot Switch with 8-foot cable and tips	WAVIN	$7.50
1206	Extra rubber covered cable, per foot	TIBER	.15
1497	Foot Switch with plug end for latest type FISCHER apparatus	ZISYV	7.50

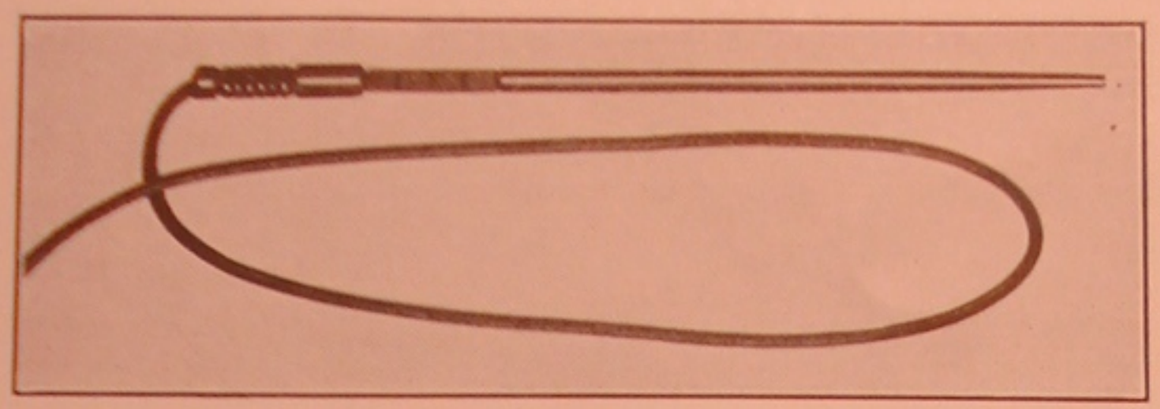
FISCHER Electrosurgical Attachment



FOR USE in connection with FISCHER short wave units, when used for coagulation or tissue-cutting. Plug into patient's outlets. Purpose of this attachment is to stabilize current used when cutting or coagulating. When attached, tissue-cutting or coagulation results are always uniform.

No.		Code	Price
3960	FISCHER Short Wave Electro-surgical Attachment	YAABA	$12.00

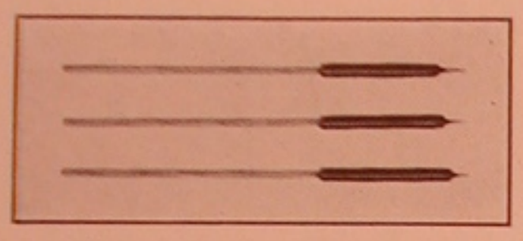
HARVEY Galvanic Needle Holder



Holder and Cord

THE requisites for a practical holder are convenience in handling, small diameter and a chucking device to hold the needle firmly during operation (see illustration). This holder provides for firm clamping of the needle by means of a slight turn of the upper segment. The light flexible connecting cord is fastened securely in the handle. Handle is constructed of hard rubber, and small in diameter. This precludes the possibility of interference with visibility when the Brinkerhoff speculum is used.

Needles are of one piece ground down from a rigid shank and polished to a hardened smoothness.



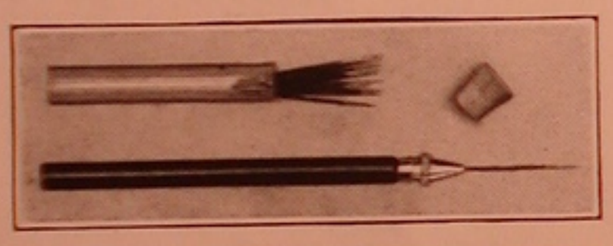
Needles

The shank is insulated by being cast into bakelite to a thickness of wall of $\frac{1}{32}$ in. to the needle end, where the insulation first quickly tapers off, forming a surface to block off hydrogen gas; after which the bakelite insulator delicately tapers to a feather edge at the polished needle surface. This latter bakelite surface prevents electrical contact with the hemorrhoid at point of insertion.

Since a needle must under no circumstances pass through the hemorrhoid and pierce the opposite wall, these needles are made in three lengths for large, medium or small blood tumors.

No.	::	Code	Price
2605	Harvey Galvanic Needle Holder, with cord (less needles)	ZIMJA	$5.50
2606	Harvey Bakelite Insulated Hemorrhoid Needle—1/8" tip	ZIMKE	.85
2607	Harvey Bakelite Insulated Hemorrhoid Needle—3/16" tip	ZIPYR	.85
2608	Harvey Bakelite Insulated Hemorrhoid Needle—1/4" tip	ZIRAN	.85
2610	Harvey Galvanic Holder, Cord and 3 Needles Nos. 2606-2607-2608	ZIFEC	7.50

Galvanic Needle Holder



Nos. 1900 and 1901

Made of hard rubber with nickel-plated metal clamp.

No.	::	Code	Price
1900	Galvanic Needle Holder	MYOPE	$2.50
1901	Galvanic Needles (12 in glass tube)	MYRRH	1.25
1902	Hayes Bulbous Pointed Steel Needles (dozen)	WEASE	2.25

Rubber Covered Connecting Cords

No.	::	Code	Price
1930	Pair (one red and one black) Rubber Covered Connecting Wires with flat terminals, for connecting moist pad electrodes to FISCHER Low Voltage and Contractile Currents Generator	WANDE	$2.00
1931	Pair (one red and one black) Rubber Covered Connecting Wires with tips to fit either FISCHER Low Voltage and Contractile Currents Generator or Small Galvanic Plate	WANTO	1.50
1933	Bifurcated Cord with Flat Terminals for connecting moist pad electrodes to FISCHER Low Voltage and Contractile Current Generator and Small Galvanic Plate	WARNE	2.75
1904	Rubber Covered Galvanic Cords, 2 colors—red and gray, 3/32" tips	MYCOR	1.50



No. 1904

Wire for Ionization

No.	::	Code	Price
2613	Zinc Wire for Ionization—6" long, 1/16" diameter	ZEFAV	$0.15
2614	Copper Wire for Ionization—6" long, 1/16" diameter	ZAZPO	.15

Spongio Discs and Handles



Universal handle, hard rubber, with felt covered disc.

No.	::	Code	Price
314	Felt Covered Disc	CARSI	$0.50
315	Hard Rubber Handle	CARHA	.85
316	Felt Pad Disc and Handle	CARMI	1.30

Leather Headband

ADJUSTABLE. Furnished with block tin (plain metal) and spongio pad (felt) electrodes (interchangeable), it is equally useful for both diathermy and galvanic treatments about the head.

No.		Code	Price
1356	Leather Headband	LETHR	$4.50



Headband and Zinc Electrode
for Nasal Ionization

CONSISTS of adjustable leather headband with binding post on front to hold special zinc-tipped electrode. Binding post on end of electrode to engage connecting cord from galvanic generator. Indifferent electrode placed on arm as shown in the illustration.

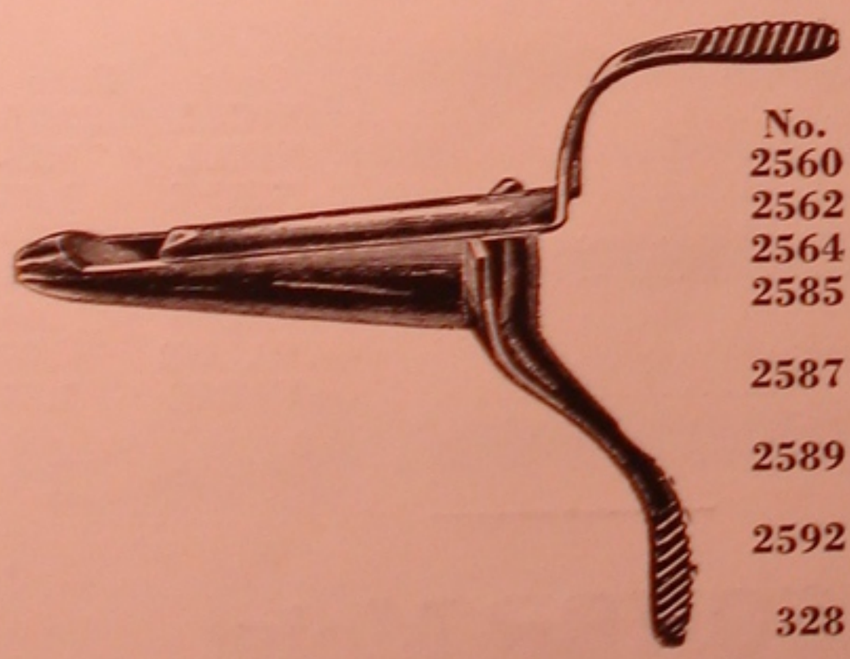
No.		Code	Price
1358	Zinc Electrode and Headband for Nasal Ionization	DADBO	$4.75
1357	Zinc Electrode only for Nasal Ionization	JAMOO	1.50
1356A	Headband only for Nasal Ionization	JEDOT	3.25



Self-Retaining Ear Speculum

FOR use in metallic ionization of chronic otorrheas. The leather band is easily placed around the head with the speculum directed into the ear canal to be treated. A free rotary motion of the speculum holder facilitates the direction of the glass speculum so that no difficulty is encountered in setting it in proper position.

No.		Code	Price
1355	Self-retaining Ear Speculum	WASSA	$12.50



Brinkerhoff Rectal Speculums

USED in connection with the HARVEY technic in the treatment of hemorrhoids by negative galvanism.

No.		Code	Price
2560	Brinkerhoff Rectal Speculum, chrome plated, small	YAMFE	$ 7.50
2562	Brinkerhoff Rectal Speculum, chrome plated, medium	YANYL	7.50
2564	Brinkerhoff Rectal Speculum, chrome plated, large	YAFWE	7.50
2585	Brinkerhoff Illuminated Rectal Speculum, chrome plated small	ZAMOC	14.40
2587	Brinkerhoff Illuminated Rectal Speculum, chrome plated medium	ZECTE	14.40
2589	Brinkerhoff Illuminated Rectal Speculum, chrome plated large	ZEMKY	14.40
2592	Connecting Cords for Brinkerhoff Illuminated Rectal Speculum (E.S.I. type)	ZELKA	2.50
328	Bulb for Brinkerhoff Illuminated Rectal Speculum	ZAKWE	1.00

IMPORTANT: All x-ray and electro-surgical-medical apparatus designed and produced by H. G. FISCHER & CO. bears the identifying trade mark — the name "H. G. FISCHER & CO., CHICAGO, ILL.," in the black-white electric disc. H. G. FISCHER & CO. manufacture no equipment outside of Chicago. This company is the ORIGINAL HOUSE OF FISCHER, incorporated in 1910. It has no connection with any other companies of similar name.

H. G. FISCHER & CO. apparatus, including accessories and supplies, is quality-built and satisfactory performance is guaranteed. Look for the H. G. FISCHER & CO. trade mark. It is your protection.

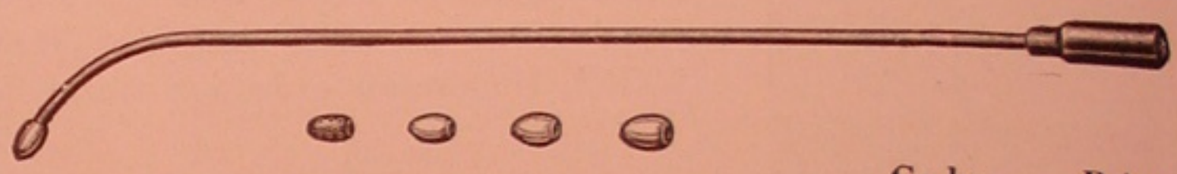


Urethral Electrodes

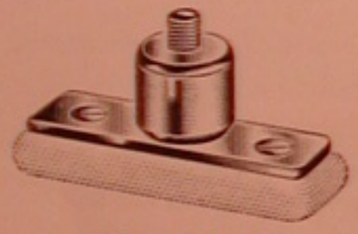
MADE in six sizes, four being all copper and two of medium size with hard rubber tips.

No.	::	Code	Price
1834	Copper Electrode, 3 tapered to 9 Fr. diameter, 2″ long, with rubber holder No. 1864	NENTU	$3.50
1835	Copper Electrode, 7 tapered to 12 Fr. diameter, 2″ long, has hard rubber tip. Mounted on holder No. 1864	NONTE	3.50
1836	Copper Electrode, 8 tapered to 13 Fr. diameter, 2″ long, has hard rubber tip. Mounted on holder No. 1864	NEURA	3.50
1860	Copper Electrode, 6 tapered to 13 Fr. diameter, 2¼″ long, with rubber holder No. 1864	NIGRI	3.00
1861	Copper Electrode, 10 tapered to 15 Fr. diameter, 2¼″ long, with rubber holder No. 1864	VARIX	3.00
1862	Copper Electrode, 14 tapered to 19 Fr. diameter, 2″ long, with rubber holder No. 1864	NIOBE	3.00
1864	Hard Rubber Holder with split contact in end for cord tip, 8½″ long, for above electrodes	NISAN	2.25
1827	Curved Copper Electrode End, only, 3 Fr. diameter, 2″ long, (same as No. 1834 but without holder)	KABUR	1.50
1828	Curved Copper Electrode End with hard rubber tip, only, 7 Fr. diameter, 2″ long, (same as No. 1835 but without holder)	KACYN	2.00
1829	Curved Copper Electrode End with hard rubber tip, only, 8 Fr. diameter, 2″ long (same as No. 1836 but without holder)	KAINI	2.00
1865	Curved Copper End, only, 6 Fr. diameter, 2¼″ long, (same as No. 1860 but without holder)	NODDL	1.00
1866	Curved Copper End, only, 10 Fr. diameter, 2¼″ long, (same as No. 1861 but without holder)	NOETI	1.00
1867	Curved Copper End, only, 14 Fr. diameter, 2″ long, (same as No. 1862 but without holder)	NODOS	1.00

No.	::	Code	Price
1870	Hard Rubber Holder with Copper Olive Tip, 17 Fr. dia.	NISSU	$2.00
1871	Hard Rubber Holder with Copper Olive Tip, 20 Fr. dia.	NITRA	2.00



No.	::	Code	Price
1872	Hard Rubber Holder with Copper Olive Tip, 23 Fr. diameter	NITRO	2.00
1873	Hard Rubber Holder with Copper Olive Tip, 25 Fr. diameter	NIVOS	2.00
1874	Hard Rubber Holder with set of 4 Olives, as above	NOBOD	4.00
1875	Hard Rubber Holder, only	NOCEN	1.50
1876	Copper Olive only, 17 Fr. diameter	NOGIN	.65
1877	Copper Olive only, 20 Fr. diameter	NONAC	.65
1878	Copper Olive only, 23 Fr. diameter	NONCO	.65
1879	Copper Olive only, 25 Fr. diameter	NONEG	.65
1880	Perforated Hard Rubber Olive, for Cataphoresis, with Holder, 19 Fr. dia.	NOODO	2.25
1881	Perforated Hard Rubber Olive only, 19 Fr. diameter	NORMA	.75

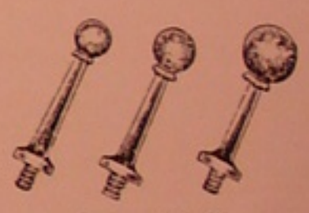


No. 1846

Small Muscle Testing Pads

PADS Nos. 1846, 1847 and 1848 are made with metal backing with asbestos as the absorbent material, and covered with linen.

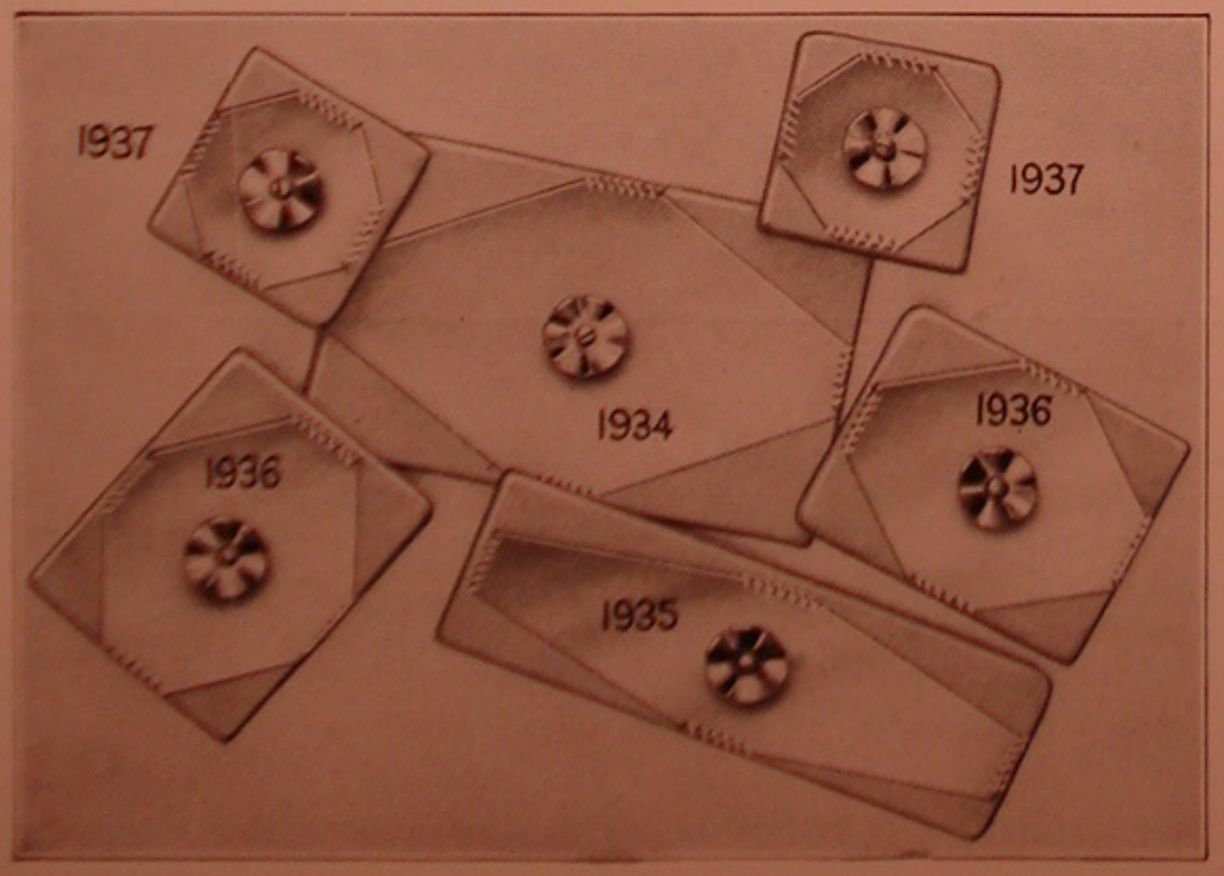
Nos. 1895, 1896 and 1897 are made of metal with a chamois covering over the ball end.



No. 1898

No.	::	Code	Price
1846	With pad 5/16″x1¾″	NICTA	$1.25
1847	With pad 3/8″x1¾″	NIELL	1.25
1848	With pad 1/2″x1¾″	NIEVE	1.25
1850	Set of 3 Pads as above	NIGGL	3.50
1895	Localizing Electrode (Small)	VALET	.55
1896	Localizing Electrode (Medium)	VALID	.65
1897	Localizing Electrode (Large)	VALOR	.75
1898	Set of 3 Localizing Electrodes as above	VARIE	1.75

(See handle No. 315 on page 32)



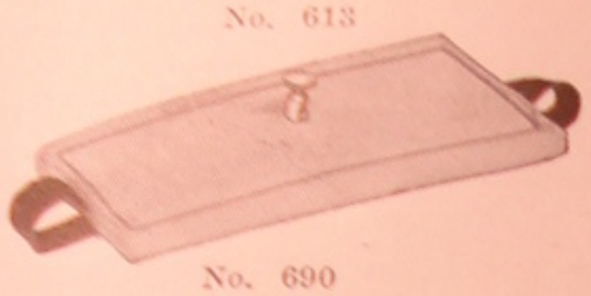
FISCHER Moist Pad Electrodes

FORMED of an asbestos compound which is thoroughly water soaked before applying. Covered with heavy white linen fabric. The metal electrode plate is sewed snugly to the pad, and contact with the connecting cord is made with the FISCHER Flat Spring Connection.

No.	::	Code	Price
1934	Flat Pad Electrode—5x8″	WAPIT	$2.00
1935	Flat Pad Electrode—3x9″	WARBL	1.70
1936	Flat Pad Electrode—4x5″	WARDE	1.70
1937	Flat Pad Electrode—3x3″	WARIL	1.60



No. 613



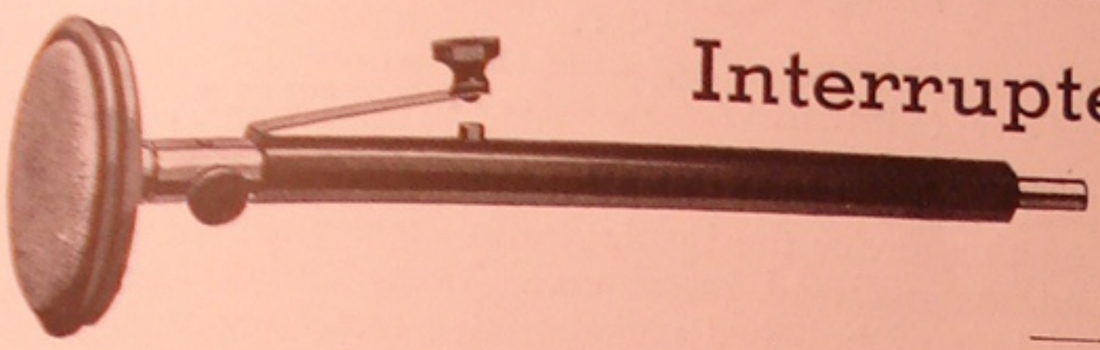
No. 690

Flexible Pad Electrodes

A FLEXIBLE felt pad, backed with pure block tin. Can be adapted to almost any shape. Has connection on back for fastening wire from machine.

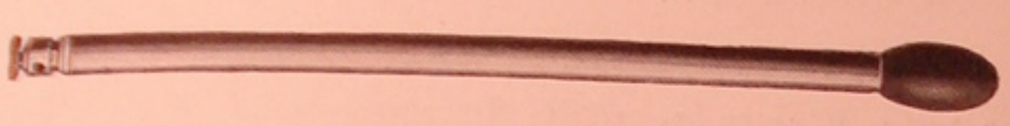
No.		Code	Price
613	Felt Pad Electrode—8″—Round	GIDDY	$2.35
690	Felt Pad Electrode—3″x6″	LASHE	1.25

Pad electrodes of odd sizes and shapes made to order. Write us your requirements.



Interrupter Handle with Moist Pad

No.		Code	Price
1831	Interrupter Handle with Moist Pad	MASHE	$5.50



Carbon Ball Electrode

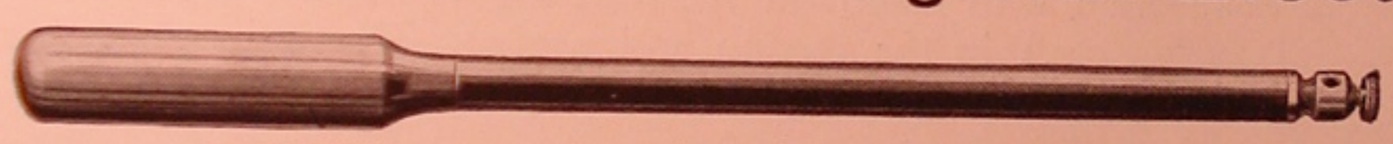
No.		Code	Price
1821	Carbon Ball Electrode	MARCU	$2.00

Oblong Copper Ball Electrode

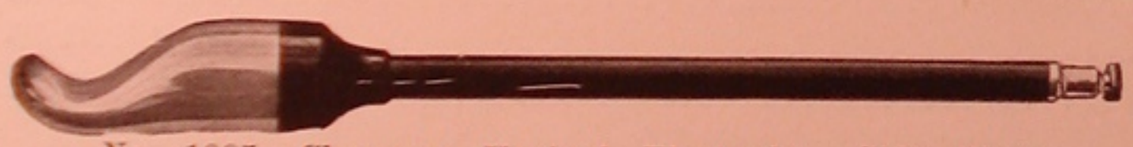


No.		Code	Price
1822	Oblong Copper Ball Electrode	MARGA	$2.50

Vaginal Electrode

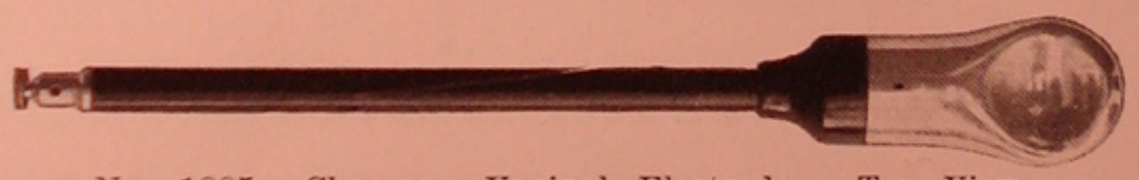


No.		Code	Price
1825	Vaginal Electrode — aluminum tip	MARLI	$3.75

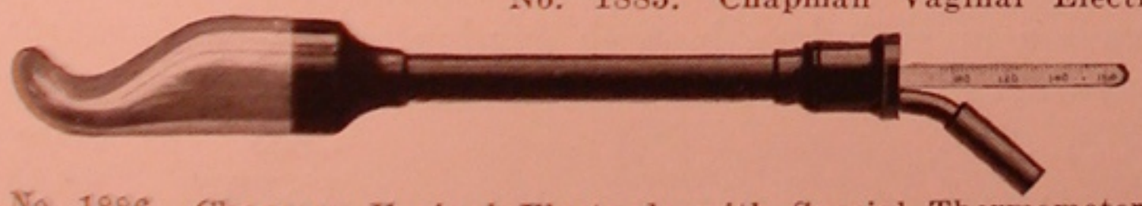


No. 1885. Chapman Vaginal Electrode — Side View

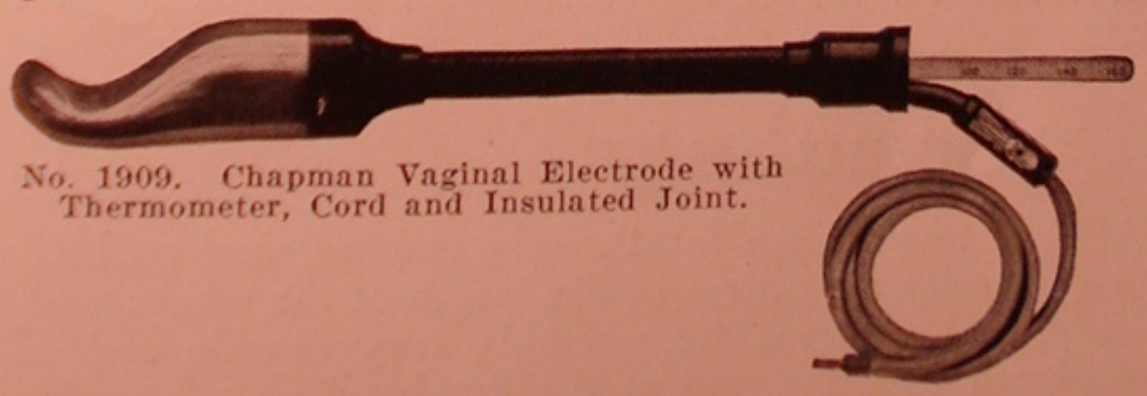
Chapman Vaginal Electrodes



No. 1885. Chapman Vaginal Electrode — Top View



No. 1886. Chapman Vaginal Electrode with Special Thermometer



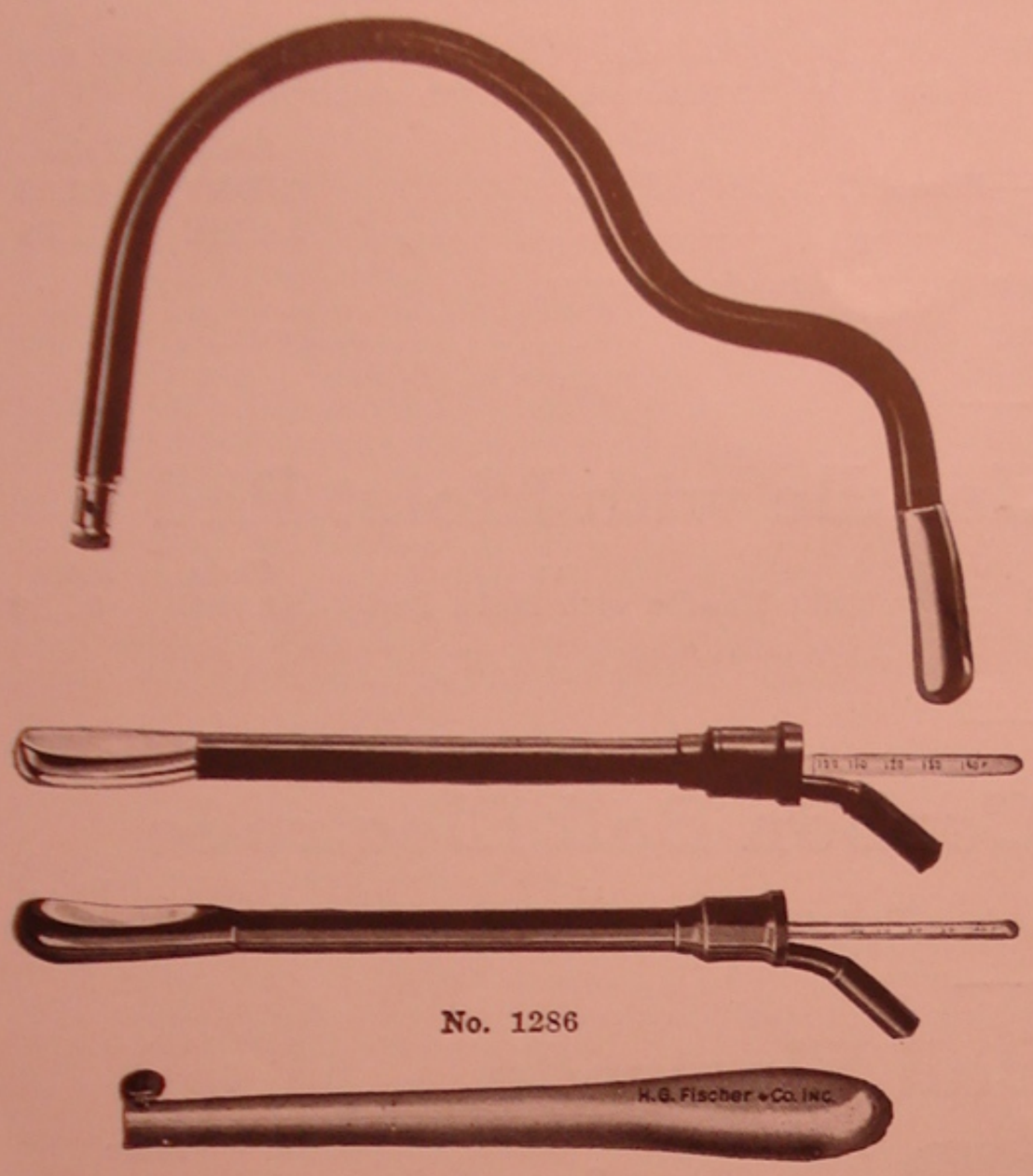
No. 1909. Chapman Vaginal Electrode with Thermometer, Cord and Insulated Joint.

DESIGNED along scientific lines, with size and shape of polished metal end to properly engage the lips of the cervix. The shank, or handle, is made of hard rubber. These electrodes are to be used with diathermy current. Supplied both with and without the special thermometer which permits the accurate maintenance of an exact temperature within the vagina. This instrument is of extreme value in the treatment by diathermy of painful or inflammatory conditions of the female pelvis.

No.		Code	Price
1886	Regulation size with thermometer. Shank 1 3/16″ diameter, cervical bowl 1¾″ wide and ⅜″ thick. Handle of hard rubber	CHAVA	$13.00
1885	Regulation size, without thermometer arrangement	CHAPE	6.75
1884	Small size, with thermometer. Shank 15/16″ diameter, cervical bowl 1 7/16″ wide, 5/16″ thick. Hard rubber handle	CHASM	13.00
1883	Small size, without thermometer arrangement	CHALI	6.75
1909	Regulation size, as No. 1886, with thermometer and with cord and insulated joint	VERMI	16.00
1907	Small size, as No. 1884, with thermometer and with cord and insulated joint	VERIT	16.00

Technic for the Chapman Vaginal Electrode is fully described in our pamphlet, "Diathermy in Gynecology." Ask for Form 643B

FISCHER Prostatic Electrodes



No. 1286

SO CURVED that when inserted into the rectum it holds firmly in place.

No.	::	Code	Price
2644	Mills type	MILLS	$5.00

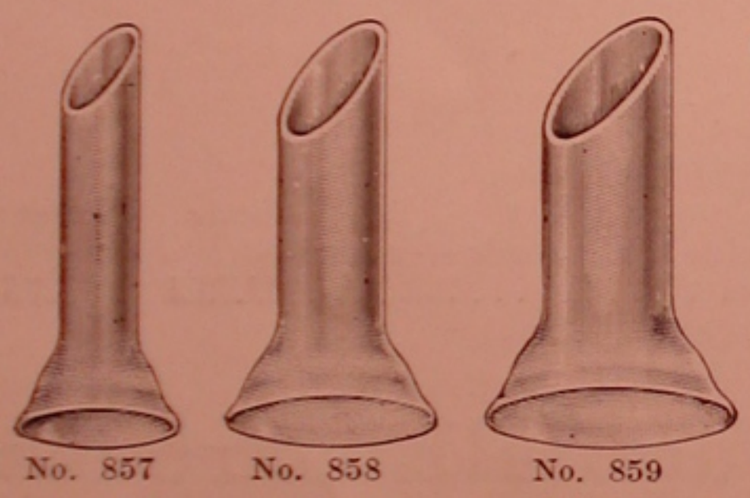
Electrode No. 1278 is constructed with hard rubber shank, the metal end being highly polished and nickel plated, correctly curved. Has insulated attachment to accommodate cable from diathermy machine. Accurate thermometer is provided.

No.	::	Code	Price
1278	Prostatic Electrode, with thermometer (FISCHER)	PRELT	$10.00

Electrode No. 1286 is also made with hard rubber shank, and on this device the insulation is carried almost entirely around the polished metal end. There is but one small curved face of polished nickel plated metal exposed. Has insulated attachment to accommodate cable from diathermy machine. Accurate thermometer is provided.

No.	::	Code	Price
1286	Prostatic Electrode, with thermometer (FISCHER)	PREIN	$10.00
1285	Prostatic Electrode, plain (like No. 1286 but without thermometer arrangement)	MARIN	6.50
1287	Oval-shaped, all metal, Mansur type	WHERR	$3.50

Glass Rectal and Vaginal Speculums

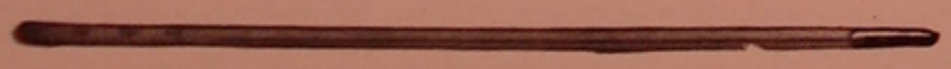


No. 857 No. 858 No. 859

FOR use in connection with electrical applications (Diathermy, High Frequency, Galvanism, etc.) in the rectum and vagina. These speculums are made in three standard sizes:

No.	::	Code	Price
857	22 mm. diameter	SABOT	$1.05
858	30 mm. diameter	SABER	1.05
859	40 mm. diameter	SACRE	1.05

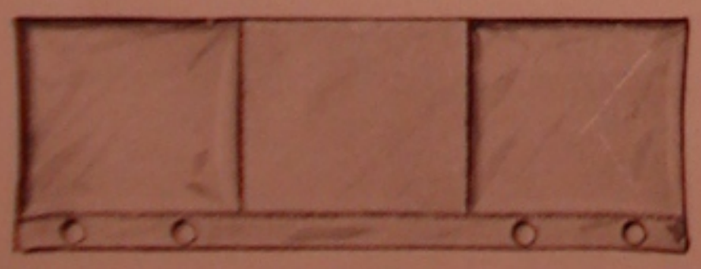
Diathermy Thermometers



SPECIAL long thermometers for use in orificial electrodes. Thermometers are of such length, with graduations at the extreme end that temperature may be read without withdrawal.

No.	::	Code	Price
1279	Thermometer (Fahrenheit scale)	THERM	$3.00
1288	Thermometer (Centigrade scale)	VERTE	3.00

Sandbags



No. 880

MADE of tough linen fabric. The end, or sand pockets are of the same size and capacity regardless of the length of the whole, and are about half filled with sand. This leaves the assembly very flexible and adaptable. When the bag is placed over the patient the flat band only bears on the electrode—the weights hang down at the sides. The longer pads are made to hang over the side of the treatment table or cot.

No.	::	Code	Price
880	5″ wide by 15″ long	NESTO	$1.10
881	5″ wide by 25″ long	SANBA	1.20
882	5″ wide by 36″ long	NETIN	1.30
883	5″ wide by 45″ long	SANNE	1.50
884	5″ wide by 60″ long	NEUBA	1.75

Mesh Electrodes With Sponge Rubber Pads



THE sponge rubber padding may be washed and always kept clean. It is very soft, and conforms well to any uneven surface. Stocked in two sizes.

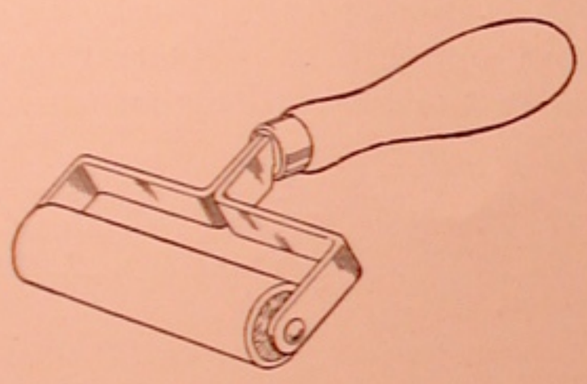
No.		Code	Price
891	Sponge Mesh Electrode—3″x5″	NEMEA	$3.00
893	Sponge Mesh Electrode—3½″x6″	NEOGA	4.25
896	Sponge pad, only, 3¼″x4½″	WEANE	.30
897	Sponge pad, only, 3½″x5½″	WEAPO	.65

Sheet Block Tin



SHEET block tin, made specially flexible for use as diathermy electrodes, 12 inches wide. This is something entirely distinctive in sheet electrode material, composed of a center of very flexible alloy with a sheet of pure tin on each side. Physicians will appreciate the fact that *pure tin* is placed in contact with the skin in preference to the lead ordinarily supplied. It is easily cut with scissors.

No.		Approx. Sq. In. Per Pound	Approx. Length Per Pound	Code	Price
840	.010 thick—30 B. & S. Gauge	250	21½″	NESSU	$0.65
841	.018 thick—25 B. & S. Gauge	144	12″	NESTL	.65
839	.031 thick—20 B. & S. Gauge	75	6¼″	NESSP	.65
842	.062 thick—14 B. & S. Gauge	48	4″	NESTH	.65



Composition Block Tin Roller

A SEMI-HARD roller of composition material, as illustrated. 4-inch roller is mounted in metal frame. Handle is of hardwood. To keep diathermy electrodes smooth and flat.

No.		Code	Price
888	Composition Block Tin Roller	TINRO	$0.50



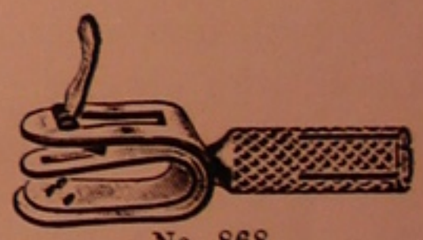
Electrode Clamp

HEAVILY constructed, with pliable rubber covering. Holds electrodes in bull-dog grip.

No.		Code	Price
874	Electrode Clamp	ZOARS	$0.60

Electrode Clips

No.		Code	Price
868	Block Tin or Mesh Electrode Clamp	NETTL	$0.30
852	The "Fahnstock" Clip	FACON	.10



No. 868



No. 2595

Crepe Bandage (Non Rubber)

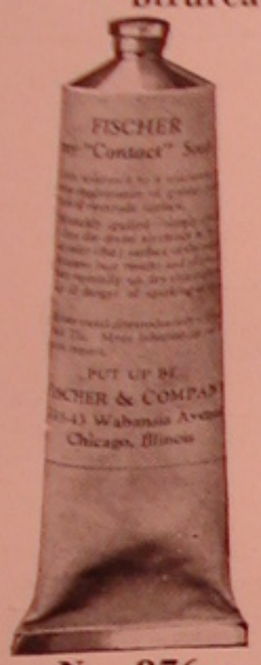
EMPLOYING crepe bandage is the only known method of binding diathermy electrodes to the limbs, which will permit the patient to move if necessary for the sake of comfort without the electrode shifting.

No.		Code	Price Yd.
2595	3″ width	ZAWIL	$0.30
2596	2″ width	ZAWKE	.20

FISCHER Diathermy Cords

IMPROVED diathermy cords, covered only with pure gum rubber. They are very flexible, easily kept as clean as when new, and constructed to give long service.

No.		Code	Price
2650	6-Foot Diathermy Cord with heavy (5/16") black rubber insulation, each	ANDRO	$1.40
2652	6-Foot Diathermy Cord with light (5/32") black rubber insulation, each	AMIGO	1.25
2653	6-Foot Diathermy Cord with light (5/32") red rubber insulation, each	AMFIL	1.25
2654	6-Foot Diathermy Cord with light (5/32") yellow rubber insulation, each	AMBUN	1.25
2655	One each No. 2652 Black and No. 2653 Red Rubber Insulated Cords, pair	APPIN	2.45
2656	Set of three—No. 2652 Black, No. 2653 Red and No. 2654 Yellow Rubber Insulated Cords	ANEAR	3.60
2658	Bifurcated Diathermy Cord (5/32") black rubber insulation, made up with 6-ft. single end, 2-ft. bifurcation	APORT	2.00



No. 876



No. 906



No. 907

FISCHER Improved Diathermy Paste

Convenient, always ready.

No.		Code	Price
876	In handy collapsible 10 oz. tube	DIASO	$0.70
906	16 oz. opalite jar	VOTIV	1.10
907	16 oz. refill for jar, in wax paper carton	VOWEL	.80

Insulating Oil for Transformers

WHEN, for any reason, the insulating oil in which a transformer is immersed needs replenishing, *never use ordinary lubricating material.* The proper oil must be mineral in substance, and capable of withstanding a very high flash test. The safest procedure is to order the desired quantity from us, with the assurance that only that oil which is exactly correct will be sent you.

No.		Code	Price
725	Tested Transformer Oil, in 1 qt. can	TRAFI	$0.60
726	Tested Transformer Oil, in 1 gal. can	TANOI	2.00

Pilot Lamps

An indicating lamp bulb used on most of our portable and cabinet apparatus.

No.		Code	Price
325	Plain Bulb	LARRU	$0.20
326	Ruby Bulb	LODGE	.20
3448	12 Volt Bulb, for Short Wave Outfits	HAMAM	.15

FISCHER Cautery and Diagnostic Transformer

THIS FISCHER Cautery and Diagnostic Light Transformer is a compact, neat generator of the closed-core type. Has a diagnostic lamp circuit with a range of from ½ to 12 volts. Can be used with perfect safety for lighting your smallest Cystoscope bulbs, or for illuminating a 12-volt lamp if necessary. Both circuits are perfectly regulated, and durably wound. Case is covered with black leatherette. Contact buttons, regulating levers, and binding posts are of brass, heavily nickel-plated, and mounted on black bakelite.

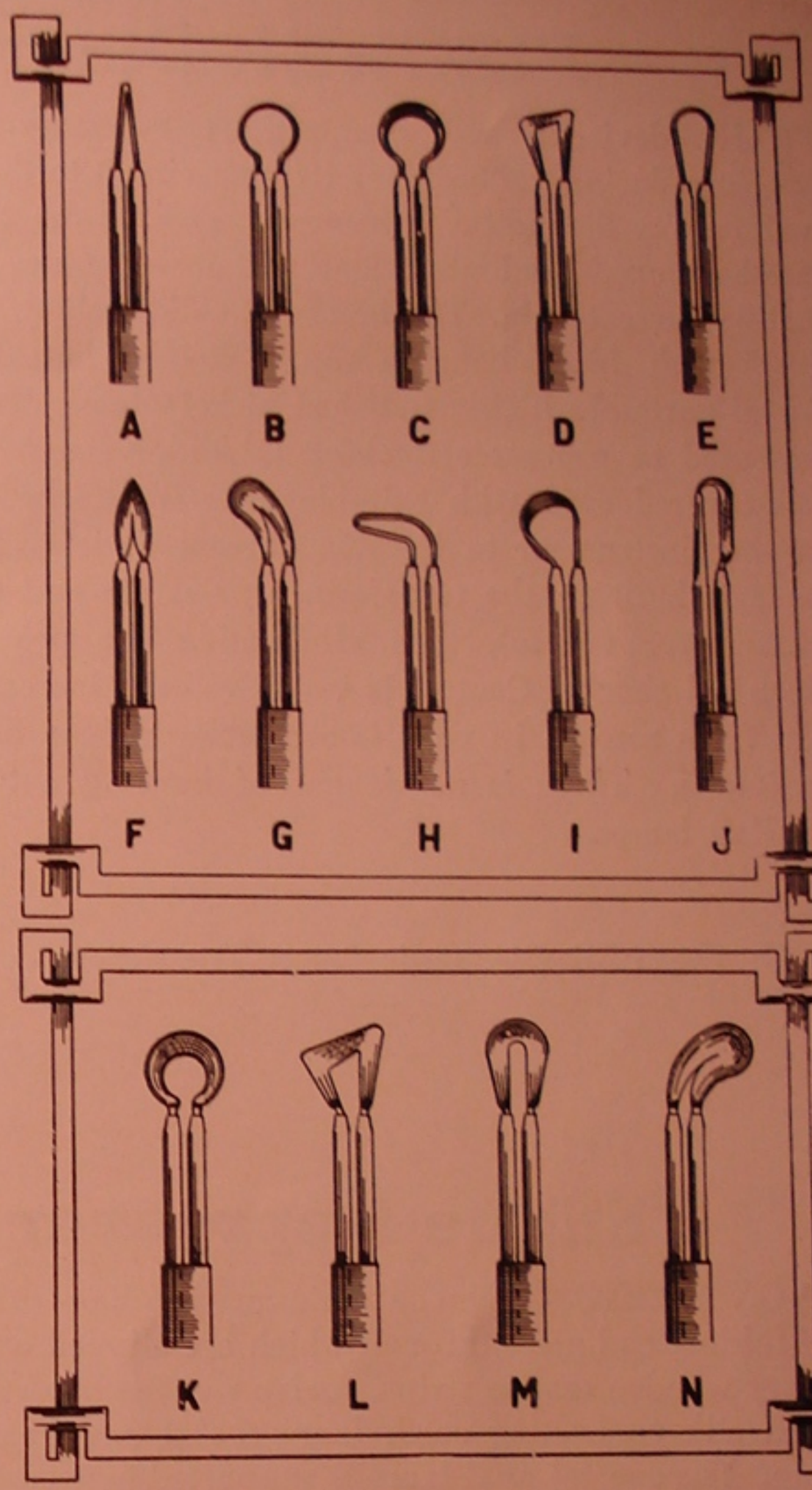
No.		Code	Price
470	Transformer only, in carrying case, with connecting cord and attachment plug, for 110 volt, 60 cycle, alternating current	ABABB	$27.50
471	Outfit with pair No. 306 Heavy Cautery Cords, 1 No. 305A Cautery Knife, 1 No. 305C Cautery Knife, 1 No. 301 Cautery Handle, 1 No. 321 Diagnostic Illuminator, complete	ABACA	34.50


No. 471

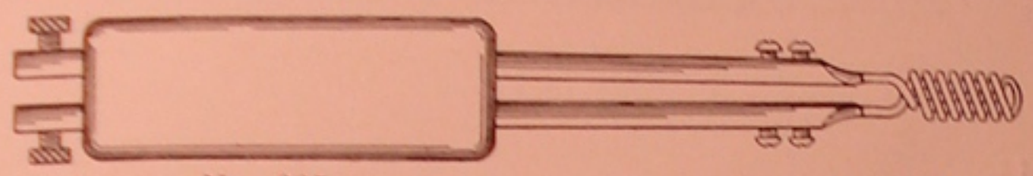
Cautery Knives

THE carefully shaped knives are securely mounted into the copper bars. These knives are shaped to conform with almost any requirements for all purposes. The copper bars are bound together by a special twisting process, and enameled to withstand heating and handling indefinitely. Knives are made of a special alloy, of high electrical resistance.

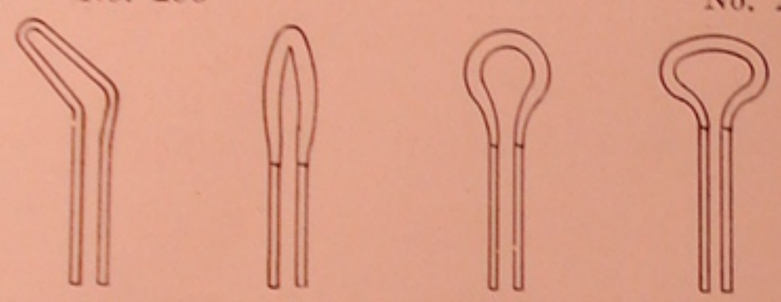
No.	::	Price
305A to 305J	Each,	$0.60
305K to 305N Heavy	"	.80
Codes Acmea, Acmeb, Acmec, etc.		



Heavy Cautery Knives and Handle



No. 295 No. 296



No. 297 No. 298 No. 299 No. 300

No.		::	Code	Price
295	Heavy Cautery Handle		PACER	$12.25
296	Heavy Spiral Cautery Knife		PACHA	1.60
297	Heavy Angular Cautery Knife		PACIF	2.05
298	Heavy Pointed Cautery Knife		PACKO	1.30
299	Heavy Plain Loop Cautery Knife		PACTO	1.40
300	Heavy Flat Loop Cautery Knife		PADDL	1.75



Cautery Handle

MADE of a practically indestructible material. Arranged to hold the knives in any one of five positions. Has contact switch for convenience in operating.

No.	::	Code	Price
301	Cautery Handle (for holding knives Nos. 305A to 305N)	ACETY	$2.75



FISCHER Cautery Cords

FLEXIBLE copper stranded wire, covered with pure gum rubber, replacing the former cords which were covered with mercerized webbing. May be washed and always kept clean as when new.

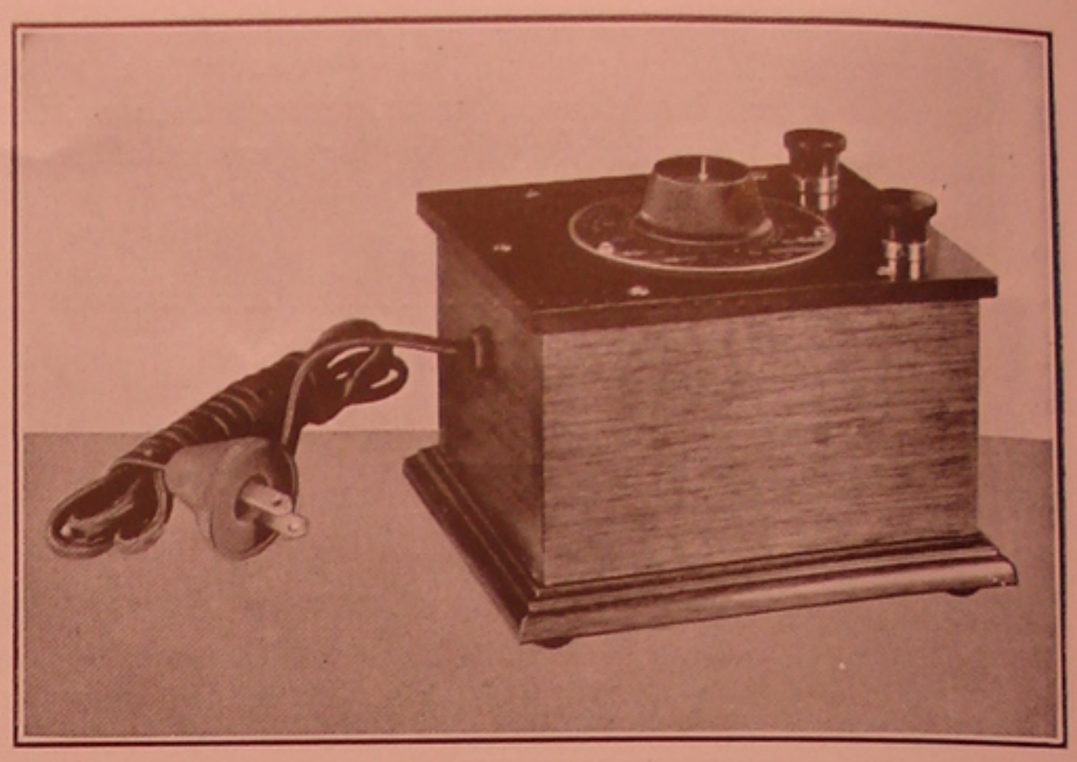
No.	::	Code	Price
1330	Cautery Cords, 6 ft., pair	NEGRO	$2.75

Note: When ordering these cords for the FISCHER Senior "FO" or "LO" Diathermy Outfits, specify No. 2655, which are supplied with special tips.

No.	::	Code	Price
306	Mercerized Covered Cautery Cords, 6 ft. pair	ACHOR	$1.00
307	Mercerized Covered Cautery Cords, 6 ft. pair to fit "CSWI" unit	DAFPZ	1.00

FISCHER Diagnostic Lamp Transformer

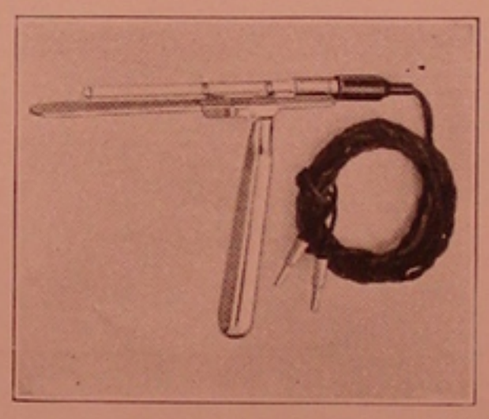
THIS device is small, compact, very necessary and useful in reducing the ordinary lighting circuit to the required voltage for diagnostic instruments, such as the cystoscope, urethroscope, headlights, and so on. Operates on alternating current only. The box is of solid walnut, 4″ x 5″ x 3½″ with black bakelite top. Weighs but 3 pounds. Metal parts are highly polished nickel plate. Rubber feet are used to prevent scratching tables or stands. A long silk-covered cord with suitable plug is attached for connecting instrument to lighting current outlet. This regulator is built on the transformer principle and delivers a ground-free current, thus eliminating the possibility of electrical shock. Control is very fine. An increase in current from zero to 15 volts is available, without any breaks or jumps. There is no danger of burning out even the smallest lamps.



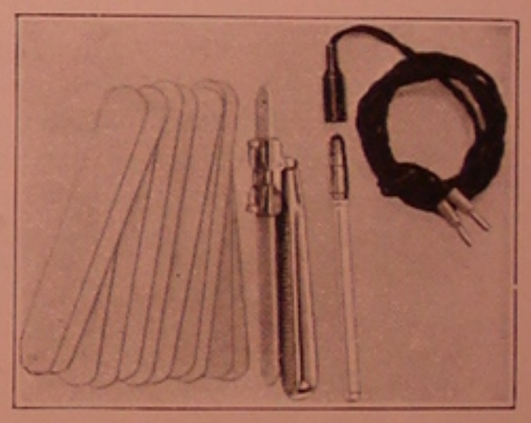
No.	::	Code	Price
2600	FISCHER Diagnostic Lamp Transformer	ZANUF	$15.00

Tongue Depressor and Diagnostic Illuminator

CONSISTING of an aluminum handle with folding end-piece through which are slipped ordinary wooden tongue strips, twelve wooden blades, green silk connecting cord, lamp socket and opal lamp. The special opal lamp is supported in spring clips above the wooden tongue blades, and is easily removed. This lamp throws an intense white light, properly focused.

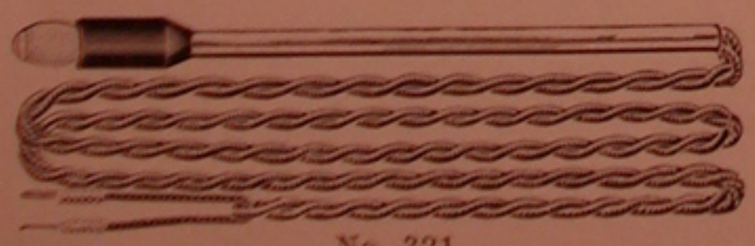


Cat. No. 340

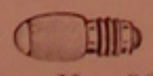


No.	::	Code	Price
335	Diagnostic Illuminator, with Cords and Socket, and Opal Lamp	USURP	$4.75
336	Special Diagnostic Lamp Bulb, only	UTHER	2.00
337	Tongue Depressor, only, with twelve blades	UVULA	2.50
338	Extra Wooden Tongue Blades, box of 12	VACAT	.15
340	Complete Lamp and Tongue Depressor arrangement, including Illuminator with Cords, Holder, and Opal Lamp, Tongue Depressor and 12 Wooden Tongue Blades	VAGUE	7.25

Diagnostic Illuminator and Shield



No. 321



No. 322



No. 324

CONSISTING of a long metal holder, with a green silk covered connecting cord, and bulb.

No.	::	Code	Price
321	Illuminator, complete with Tungsten lamp	ANALO	$2.50
322	Bulb only, 3.8 Volt, lens in end	ACIDD	1.30
329	Bulb only, 3.8 Volt	HETOL	.35
324	Polished Nickel-plated Shield for No. 321	AGILE	.55

Price List of Therapeutic Carbons

No.	Type of Carbon	Code	Lots of 10	Lots of 50	Lots of 100
2177	("A") 8mm. x 6"	YUCAR	$1.25	$6.25	$12.50
2178	("C") 8mm. x 6"	ACREN	1.60	8.00	16.00
2180	("E") 8mm. x 6"	ADAGG	1.45	7.25	14.50
2183	("B") 8mm. x 6"	ALLYL	1.55	7.75	15.50
2185	("K") 8mm. x 6"	ALTOO	2.75	13.75	27.50
2188	("A") 8mm. x 12"	ALARY	2.00	10.00	20.00
2189	("C") 8mm. x 12"	ANILL	2.60	13.00	26.00
2191	("E") 8mm. x 12"	APEXX	2.20	11.00	22.00
2194	("B") 8mm. x 12"	AMIRI	2.55	12.75	25.50
2196	("K") 8mm. x 12"	ANARX	5.05	25.25	50.50

Ultra-Violet Goggles

No.		Code	Price
2254	Infant's Goggles	CHIGO	$0.50
2255	Adult's Goggles	GLAGO	.50
2256	Adult's Goggles	PHYGO	1.00

FISCHER Catalog . . . X-Ray Apparatus

Accessories and Supplies



THIS is Catalog No. 37. Measures 8½"x11" — 52 pages. Gives a complete listing of all FISCHER X-Ray Apparatus, also such accessories and supplies as are vital in high quality radiographic and fluoroscopic work. In this catalog, effort was made—

. . . To include all items needed by the x-ray specialist, medical or dental.

. . . Many competing items are shown, such as screens and films, permitting selection to be made.

. . . Prices are inserted for convenience of customers.

. . . A handy reference index is placed at the back.

Catalogs of this type are naturally expensive and not for indiscriminate distribution. This catalog is intended primarily as a service to FISCHER customers. It will, however, be sent, without charge to any interested physician or dentist.

BOOKS

No.	::	Code	Price
2300	"Actinotherapy for General Practitioners" by H. G. Falkner, L.R.C.S.I. 152 pages. Illust.	VAGGE	$3.00
2301	"Actinotherapy with Special Reference to Ultra-violet Radiation" by D. D. Rosewarne, M.R.C.S. 237 pages. Illust.	VAHXE	4.00
2302	"A Hand-Book of Physio-Therapy" by Alvah M. Stafford, M.D., 279 pages. Illust.	VAXEH	6.00
2303	"An X-ray Atlas of the Normal and Abnormal Structures of the Body" by Archibald M'Kendrick, F.R.C.S. and Charles R. Whittaker, F.R.C.S. 2nd edition. 256 pages	VAXIX	10.00
2305	"Artificial Sunlight and Its Therapeutic Uses" by Francis Howard Humphris, M.D. 5th edition. 340 pages. Illust.	VEHEB	3.25
2696	"Artificial Fever" by Neymann (1938 edition)	TIAUV	6.00
2306	"A Treatise on Light" by R. A. Houstoun, M.A. 5th edition. 489 pages. Illust	VEYER	4.20
1757	"Clinical Application of Sunlight and Artificial Radiation" by Edgar Mayer, M.D.	WAGON	10.00
2347	"Diathermy Medical and Surgical in Oto-Laryngology" by Dan McKenzie, M.D. 184 pages. Illust.	ZANDO	4.00
2307	"Diathermy with Special Reference to Pneumonia" by Harry Eaton Stewart, M. D. 2nd edition. 228 pages. Illust.	VEXAB	3.00
2344	"Electrotherapy and Light Therapy" by Richard Kovacs, M.D.	ZIURS	7.50
2299	"Elements of Physical Therapy" by William W. Worster, A.B., A.M., M.D., 2nd edition. 232 pages. Illust.	VIVVO	5.00
1976	"Electrothermic Methods in the Treatment of Neoplastic Diseases" by J. Douglas Morgan, M.D.	WASHE	2.50
2309	"Facts About Artificial Sunlight" by E. L. Ash, M.D., 62 pages	VIXAX	1.00
2697	"Foundations of Short Wave Therapy" by Holzer and Weissenberg (1935 edition)	TIAWX	5.00
2345	"Fundamental Principles of Ray Therapy" by William Beaumont. 124 pages. Illust.	ZIUST	2.40
2335	"Galvanism and Sine Current Technique" by Frederick H. Morse, M.D.	ZELJY	6.00
2310	"Handbook of Medical Electricity and Radiology" by James R. Riddell, F.R.F.P.S. 239 pages. Illustrated.	VIBIX	2.75
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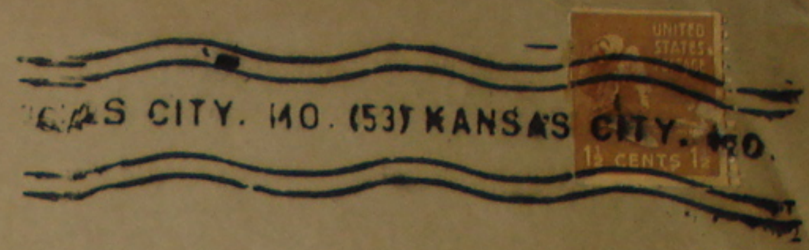
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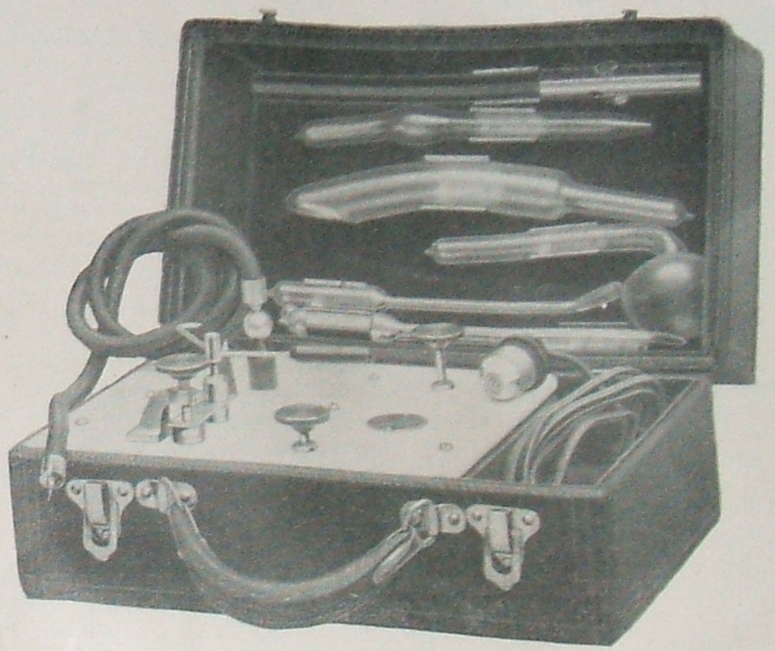
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What Are High Frequency Currents?

This Question Made Clear in a Graphical Way By Comparison With Water

In our demonstration we will assume that the voltage will be the water pressure at the hydrant. When we increase the pressure we increase the amount of water we can draw, due to the speed with which the water flows.

The voltage obtained from Type "F" coil is 60,000 volts, or approximately 600 times the voltage of the average electric lamp used. If you were to touch both terminals of a lamp socket, you would receive a severe muscular shock, though the voltage of the current would be only one-six hundredth of what you would receive from Type "F" coil.

Let us see what 600 times the pressure of the water at the hydrant would mean. Upon opening the faucet, a stream of water would travel at such speed that anything brought into contact with it would be struck as with a blow from a sword.

This same condition would prevail if electrical currents of 60,000 volts were permitted to enter the human body. It would be as a sword thrust that would cleave from head to heel.

Now let us take this tremendous pressure and force the water through an atomizer with hundreds of thousands of tiny holes. The result would be a mist of spray that would permeate the entire surrounding atmosphere. The most delicate flowers would be refreshed and would thrive, when treated in conditions produced in this manner.

In the generation of high frequency currents, an electrical condenser is connected in the circuit, acting as does the atomizer, in separating the flow into minute impulses of such rapid succession that no sensation affects the nervous centers. Likewise there is no muscular contraction.

The human nervous system can detect oscillations in an electrical current up to 10,000 per second, and as the frequency increases, the sensation decreases. Type "F" has a frequency of over **one-half million** per second.

The physician therefore has at his command a tremendously powerful agent which he can apply safely to his patients, giving them in a few seconds more benefit than with hours of the one time popular battery outfit.

WHAT ELECTRICAL PROGRESS MEANS TO THE MODERN PHYSICIAN

The study of the application of high potential, high frequency currents, has opened a field of unlimited possibilities unknown to most physicians. However, at the present time with up-to-date methods in the generation and use of these valuable electrical currents, every physician is confronted with the fact that a new science has been in process of development. It is now a well established fact that by no other application of electricity can such profound physiological results be obtained.

Almost every doctor has had an old battery outfit for administering the galvanic and faradic currents, but so limited has been the therapeutic use of these batteries that they have been in almost every case discarded, not as useless, but because results did not warrant any further investigation on the subject.

Not so, however, with the modern high frequency violet ray current of today. A great many of our ablest physicians and conscientious investigators have recently written volumes on the subject; and with all this literature and up-to-date equipment at the command of the modern Physician, he has in these highly developed electrical currents as now perfected one of the most powerful and wonderfully successful agents that has ever been placed in his hands for combating disease and restoring the human body to its normal healthy physical condition.

The term High Potential is merely indicative of high pressure or voltage, the same running in various treatment machines as high as from 30,000 to 60,000 volts.

The wonderfully beneficial results that progressive physicians nave recently been enabled to obtain with modern high frequency violet ray currents as now perfected and produced by our Type "F" Generator, covers such a wide range of diseases, and in very many cases the effect is so marvelous and satisfactory, that it is plainly a duty that every intelligent physician owes to himself, as well as to his patients, to provide his office with this most useful and modern equipment—**and his patients expect it.**

The worth of a tool like a promissory note, depends upon the name of the maker. Type "F" is backed by experience and a maker whose guarantee assures you that you have the BEST that can be made.

There is no quackery or uncertainty about the high frequency current and it is not put forward as a cure-all. It is a thorough cell massage and a healthful stimulant and its intelligent use is a wonderful aid in restoring to normal the physical condition that may have been impaired from most any cause. The results obtained are almost universally beneficial and never harmful.

The practitioner, once initiated into the results obtained from the use of high frequency high potential violet ray currents such as generated by Type "F," finds their use absolutely indispensable.

We pride ourselves in the extreme **high** frequency produced by Type "F" Violet Ray Generator. We have a current here that the physician can use with absolute safety to himself and his patient, and rest assured that he has done all that can be done in the shortest possible time.

Type "F" is not a toy, and we want to call your attention to the fact that when button "E" is pressed to bottom, you have a powerful current to deal with. A current that may aggravate or even burn your patient, when used where not indicated. (We refer chiefly to internal treatments.) Therefore we say play safe, doctor, and remove button "E" entirely when you are doing delicate work. This will positively assure you that you are using currents of **highest** possible frequency.

No other outfit has this feature, and the physician using other outfits is compelled to regulate as best he can with a current of medium power, which is neither high nor low enough in frequency to cover all cases.

Bear in mind that all internal treatments must be made with extreme high frequency to avoid discomfort to the patient and Plug "E" **must** be pulled out.

Another feature combined in every Type "F" is a Tesla Coil protector, which insures long life and enables us to guarantee it for twice the length of time of any other coil. Hence our statement, **"it will outlive you."**

Type "F" outfit is substantially built upon **White Italian Marble,** and is inclosed in a **plush** lined case with **steel Valence.** The outer trimmings being of **brass** heavily nickel plated.

GENERAL INSTRUCTIONS

For the Use of High Frequency Violet Rays Generated by Type "F" Outfit

We recommend the more detailed method of instruction as given in the following text-books:

High Frequency Manual.....	Eberhart..	$4.00
High Frequency Currents.....	Strong....	4.00
Currents of High Potential.....	Snow.....	5.00

The following are a few suggestions for treating diseases taken from cases where physicians have obtained excellent results. Not all of them through high frequency alone, but as a valuable adjunct in the treatment thereof.

Abscesses—Electrode No. 1. Keep in contact with skin and treat for 5 to 7 minutes with medium spark high frequency current.

Acne—The fulguration electrode No. 20 is used for quickest results. Cauterize the larger pustules and treat the entire surface affected with the No. 1 Electrode for a few minutes.

Acne Rosacea—Electrode No. 1 or No. 2. Medium frequency. Keep electrode away from surface to get cauterizing effect of spark. Duration of treatment to be decided by severeness of case. Where much surface is to be covered, lengthen time to 10 minutes.
Read Eberhart's Manual.

Alopecia—Electrode No. 1 or No. 11. Use medium frequency over the scalp for 5 minutes. If current is too strong, use higher frequency and lengthen the time.

Anus, Fissue of—Electrode No. 2 is to be used. Treat about 4 to 6 minutes with high frequency current as strong as patient can bear without discomfort.

Arteriosclerosis (Hypertensia)—Daily treatments of 5 to 8 minutes with No. 1 electrode highest frequency will serve to lower the blood pressure.
Read High Frequency Currents, by Strong.

Diagnosis like criticism is of little avail, unless it travels hand in hand with Remedy, Treatment and Cure.

Atrophy of Optic Nerve—Electrode No. 8. Highest frequency. Apply directly to closed eyelid for 2 to 4 minutes every other day.

Barber's Itch—General treatment with No. 1 Electrode for 5 minutes, daily if possible.

Boils—Electrode No. 1. Apply strong spark of medium or high frequency through gauze or about one-fourth inch from surface. Fulguration with milder spark can also be employed with boils not discharging, after which the ozone spray is recommended.

Brain Fag—Same treatment as for lowering blood pressure. When blood pressure is low, permit breathing through ozone generator.

Bronchitis—Ozonize the air with ozone generator. This is the simplest and most effective method.
Sharp sparks over chest and back sufficient to produce reddening give relief.

Bunions—Use No. 7 Bunion Electrode, medium high frequency, 6 to 8 minutes. Keep in contact with skin. Relieves all pain.

Callouses—Use Fulguration Electrode No. 20 with as strong and as low a frequency as can be borne by patient.

Cancer—Can be benefited by use of fulguration.
Read Eberhart's Manual.

Catarrh (of nose)—Electrode No. 1. Medium frequency. Apply on outer surface of nose and back of neck. Use No. 4 or No. 15 Electrode internally with high frequency for 2 or 3 minutes. Breathe through ozone generator using nasal tube.

Catarrh (of womb)—Electrode No. 3 or No. 13 preferred. Medium to high frequency. Use in contact with cervix for 3 to 5 minutes every other day.

Cervical Glands (enlargement of)—Daily applications until the glands disappear. lessening length and severity of treatment as they reduce in size.

Cold Extremities—Low frequency and strong spark, but be sure to keep in contact with skin, using No. 1 electrode for 5 minutes, or until a redness is produced on the skin. Repeat daily.

Constipation—Rectal Electrode No. 2 or No. 12. High frequency, strong current. Treat internally for about 5 minutes, repeating daily.

Corneal Opacity—Eye Electrode No. 8. Mild high frequency directly in contact with closed eyelids for 2 to 5 minutes.

Corns—Use No. 30 corn Electrode with strong spark, from 4 to 5 minutes. You can also use Electrode No. 20. Give treatment every other day.

Chilblains—Use No. 1 Electrode, low frequency. Keep in contact with skin for 10 minutes. Treat every other day until cured.

Coryza—Read Nasal Catarrh. Also stroke sides of face with same electrode.

Deafness—Ear Electrode No. 17 is preferred; in the absence of which use point of Electrode No. 6. Use only mild high frequency current for 3 to 5 minutes.

Diabetes—Local application will retard the disease.
Use Mild High Frequency.

Dyspepsia—Electrode No. 1. Medium spark, high frequency. Apply over region of stomach daily for 5 to 8 minutes. After beneficent results are obtained, treat every other day.

Eczema—Use body electrode, preferably covered with gauze. Treat for about 2 or 3 minutes only, using medium frequency.

Eye Diseases—Various forms yield under proper treatment. We recommend Dr. Eberhart's Manual for intelligent use. See page 12.

Freckles—Electrode No. 1 with medium to high frequency. Apply through gauze. Daily treatments of 5 to 9 minutes' duration. Be patient, as results are apt to be slow.

Goitre—Some cases yield to the following treatment: No. 1 Electrode with as strong a current as can be borne without discomfort. Treat through thin gauze or in direct contact with skin daily. Not over 7 minutes' duration.

Gray Hair—Patient treatment for months every other day with Comb Electrode No. 11 will bring pleasing results, the natural color returning.
Read Dr. Eberhart's Book.

Hay Fever—Read Catarrh of Nose and treat similarly.

Headache—When not caused by stomach, apply Electrode No. 1 with medium spark high frequency over forehead, and back over the ears to back of neck. Occasionally down the spine.

Hemorrhoids—Use rectal electrode No. 1 or 12. Use delicate high frequency current. To remove, use fulguration Electrode No. 20.

Hypertension—Auto condensation produces most rapid results. See Arteriosclerosis.

Hypotension—Apply Electrode No. 1 to spine with heavy spark.

Impotence—Use insulated rectal Electrode No. 12 across the genitals with medium to high frequency current, for 4 to 6 minutes.

Inflammations—Use Medium High Frequency from 4 to 6 minutes.

Influenza—Breathing through ozone generator brings immediate relief. Follow with treatment over sides of nose, and in some cases use nasal electrode internally.

Lumbago—Electrode No. 1 with sharp spark over and beyond painful area. Treat every other day for about 6 minutes.

Massage—Electrode No. 1. Medium or low frequency as preferred by patient. The lower the frequency and the sharper the spark, the shorter the time required for treatment. Through heavy gauze is ideal.

Moth Patches or Moles—Fulguration Electrode No. 20 with medium or high frequency. Do not overtreat, as 1 to 2 minutes suffices over a small area.

Nervousness—Treat over spine with medium to high frequency. Daily treatments at first, followed by treatments every three days for about one month.

Neuritis—Surface Electrode No. 1. Heavy current, high frequency. Relief almost instantly. Do not treat over same surface over 5 minutes, but treat twice daily if at all possible. Results are most pleasing, even in chronic cases.

Paralysis—Electrode No. 1 with sharp spark of medium frequency. Apply over muscles in contact and by patting, raising the Electrode about one-quarter to one-half inch above the surface. Treatments should be made daily and be of 4 to 8 minutes' duration.

Prostatic Diseases—Special Electrodes are made for treating diseases of the prostate, but excellent results have been obtained by use of Electrode No. 12, in reducing enlarged prostate.
A mild, medium frequency is used for 5 to 10 minutes.

Pyorrhea Alveolaris—Apply Special Dental Electrode No. 61 to gums for 3 to 5 minutes, using high frequency and in direct contact with the gums.

Rheumatism—Combine treatments as given in Neuritis and Paralysis.

Rodent Ulcer—Best results are obtained with X-ray. Fulguration Point No. 20 has been used to destroy the affected tissue.

Skin Diseases—The Dermatologist will find many uses for the high frequency current due to its cauterizing, escharotic and antiseptic properties. Read any good book on the subject of high frequency or high potential currents.

Sciatica—Body Electrode, medium frequency. Apply for 5 to 7 minutes.

Sore Feet—Use No. 1 Electrode 6 to 8 minutes with strong spark.

Stiff Joints—Apply as for Neuritis with longer treatment if deemed necessary.

Throat Diseases—Use Throat Electrode No. 5 or No. 18 with mild current high frequency. Finish by treating above and below larynx with Electrode No. 33. Duration of treatment about 8 minutes.

Torticollis (Stiff Neck)—Treat back of ear and down back and sides of neck. Use Electrode No. 1 with sharp spark medium frequency, patting the surface gently. Give treatments of 10 minutes or longer.
Treat over closed eyelid for 1 to 3 minutes.

Trachoma—Apply Eye Electrode No. 8 with highest frequency.

Ulcers (Chronic)—Treat through gauze with as sharp a spark as can be tolerated, using Electrode No. 2 or surface No. 1. Ozone generator can be used to advantage by employing the spray.

Uterine Diseases—Use Electrode No. 13 and apply with highest frequency for short periods. Beneficial results are always obtained.

Warts—Use Fulguration point, or in absence of same use Electrode No. 6. Treat with low frequency, using a spark about ⅛ inch long, or sufficiently long to cauterize.

When using Fulguration point let it rest on top of wart and press lever several times, passing spark through deep crustation. One treatment usually is sufficient, but if no results are apparent after 5 days, repeat.

□ □ □

In the foregoing suggestions we refer to High, Medium and Low frequency currents, as well as to Sharp, Medium and Mild sparks. To make this clear, we add that **Highest** frequency is obtained when plug "E" is pulled up or out. To gradually reduce frequency, turn screw "A" counterclockwise about one-half turn, or until vibrations become noisy. At this point we refer to current as **medium frequency** and it is approximately the same frequency as is generated when screw "A" is turned down close to stop and plug "E" is pressed to bottom. From this point the frequency can be made still lower by repeating the process of turning counterclockwise. The latter point is the **lowest** frequency and is a very powerful current.

Length of spark used in treating can be adjusted by setting point "C" at different distances from ball "D."

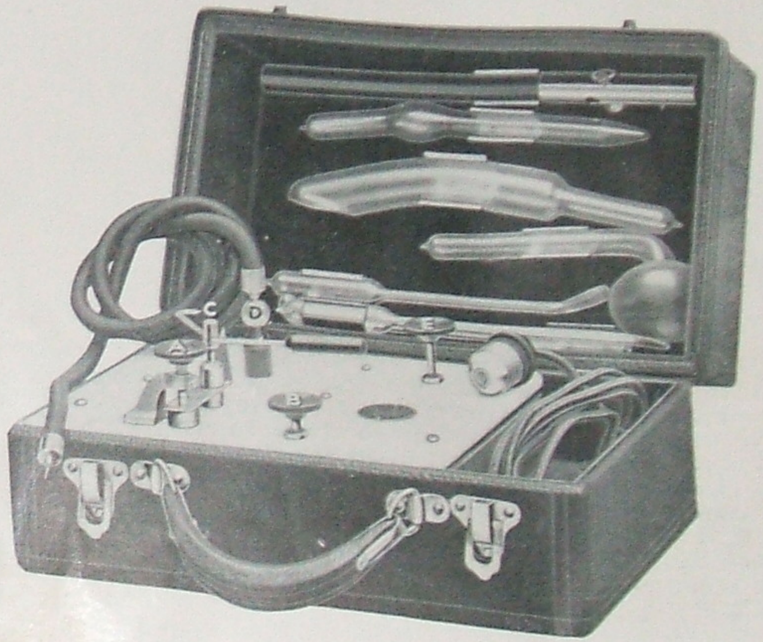
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Note: Ozone generated by Type "F," as well as from any other high frequency outfit, is best applied through the ozone generator, through a solution of oil of pine needles and Eucalyptus.

□ □ □

Note: All of our cord tips are of the split type and can be spread with a knife blade where too loose. Friction can also be given to spark point "C" by spreading support with knife blade.

DIRECTIONS FOR OPERATING TYPE "F" HIGH FREQUENCY COIL



Attach plug on green cord to socket of 110 volts, Alternating or Direct Current.

Press down button "B." Screw down regulator "A" to stop, then slowly unscrew "A" until a smooth flow of current passes between the point of spark regulator "C" and the ball of active pole "D."

Touch ball "D" with point of "C."

Pull up "B" and attach black cord to handle and to ball "D."

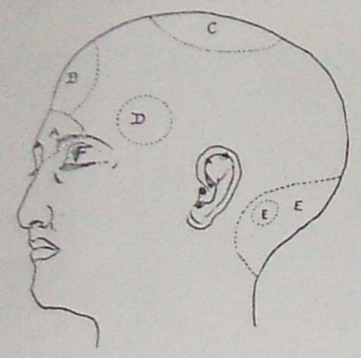
Press down "B" and open point "C" until the desired amount of current passes through the tube.

For delicate treatment, hold hand on tube while making or breaking contact with your patient.

Plug "E" down gives Lowest frequency, but Highest power.

Plug "E" up gives the Highest frequency, but Lowest power.

High Frequency In Eye Treatments



After examining a patient's eyes with the ophthalmoscope or ophthalmometer and before proceeding with the test chart, give patient a one minute treatment on each eye "F" with eyelids closed. Use single or double eye electrode with plug "E" up. Mild current. This treatment is for relaxing the accommodation, poor circulation, and dimness of vision. For asthenopia, headaches and muscular imbalance, treat areas marked A, B, C, D and E about one minute each. Use single eye electrode. If the patient has asthenopia, excellent results are obtained by using large surface electrode up and down the spine and across shoulders for about 3 minutes. From 6 to 10 treatments (one daily) are usually given. For delicate treatments hold your hand over the electrode before making or breaking contact with the surface of the skin.

Do Not Touch Metal Parts While Machine is in Operation

Dr. Eberhart's Manual on high frequency says: "Frontal or congestive headaches are relieved by passing electrode back and forth over seat of pain. Keep the tube in close contact to prolong the treatment until relief takes place which will usually be about 5 minutes." The diagram outlines the areas where headaches occur. This will be useful in suggesting the probable line of treatment. In treating areas A, B, C, D and E, plug "E" can be pushed down.

Dr. Eberhart's Manual on high frequency gives a complete treatise on all eye diseases. Price $4.00.

Sent post paid on receipt of price. It will greatly aid the optometrist in this work.

INDIRECT TREATING

The Glass Handle, No. 53, illustrated on page 15, or our special Metal Handle, made for the same purpose, is to be used for "Indirect" treatments. Connect the Heavy Black Cord into the ring on the end of the No. 53 Handle, other end of cord into Pole "D," and have the patient hold the glass with both hands. The current will then pass into the body, freely, and can be withdrawn by simply touching your fingers to any part of that patient's body. You will find this an excellent way to get at parts which are somewhat awkward to reach with the glass electrodes and that the current discharge will be very mild, but considerable warmth generated.

□ □ □

To intensify the action of the High Frequency Current as delivered by the regular glass tube, use two cords. Place the tip of one cord into the Neutral Pole "C," the other end to the Glass or Metal Handles, having the patient hold this handle firmly; then apply the electrode as you would for an ordinary High Frequency treatment, connected to Pole "D." This intensifies the current, as Pole "C" is grounded, and the discharge across is somewhat stronger than when using Pole "D," only.

□ □ □

PRICES

No. 479 Type "F" Portable, with connecting Cord and Plug, ready to attach to any Electric Light Socket.
Code—ABADE $26.50

No. 484 Outfit, same as No. 479, with addition of Cautery Circuit.
Code—ABORAD $29.50

No. 489 Outfit, with Cautery Circuit, same as No. 484, and full set of High Frequency Electrodes as outlined with No. 480.
Code—ABOX $35.00

No. 480 Outfit, consists of "F" Portable No. 479 with addition of:
1 No. 1 Surface High Frequency Electrode,
1 No. 2 Rectal High Frequency Electrode,
1 No. 3 Vaginal High Frequency Electrode,
1 No. 4 Nasal High Frequency Electrode,
1 No. 5 Throat High Frequency Electrode,
1 No. 6 Urethral High Frequency Electrode,
1 No. 50 Insulated Handle,
1 No. 51 Heavy Insulated Cord.
Code—ABBE, complete $32.50

No. 481 Outfit, with Cautery Circuit, full set of 6 Electrodes, Cord and Handle, as outlined with No. 489, and
1 No. 301 Adjustable Cautery Handle,
2 No. 306 Cautery Cords,
1 No. 305A Cautery Knife,
1 No. 305B Cautery Knife,
1 No. 321 Diagnostic Illuminator, with Cords, Holder and Tungsten Lamp,
1 No. 20 Fulguration Handle with 3 Tips.
Code—ABDUCT $43.50

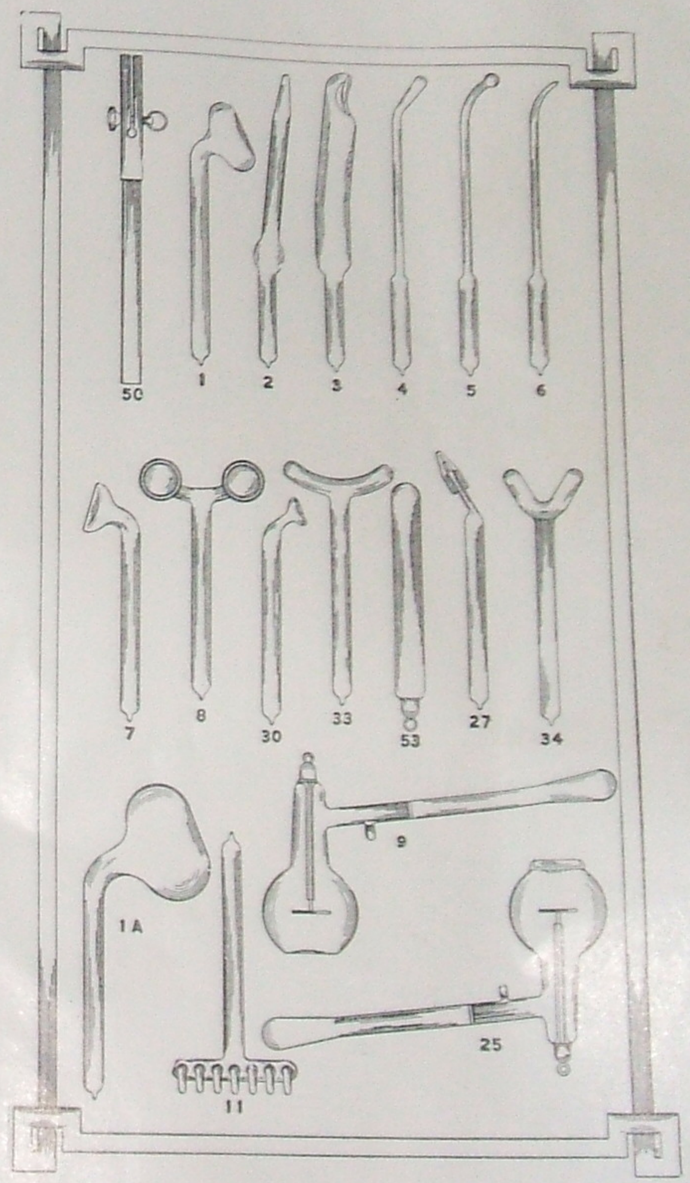
No. 482 Dental Outfit, consists of:
1 No. 479 Portable "F" Generator,
1 No. 01 Surface Electrode,
1 No. 061 Insulated Pyorrhea Electrode,
1 No. 062 Insulated Cocain Electrode,
1 No. 063 Insulated Cavity Electrode,
1 No. 064 Insulated Outer Gum Electrode,
1 No. 049 Insulated Rubber Shock Proof Handle, with Heavy Protected Cord Attached.
Code—ABIES $35.00

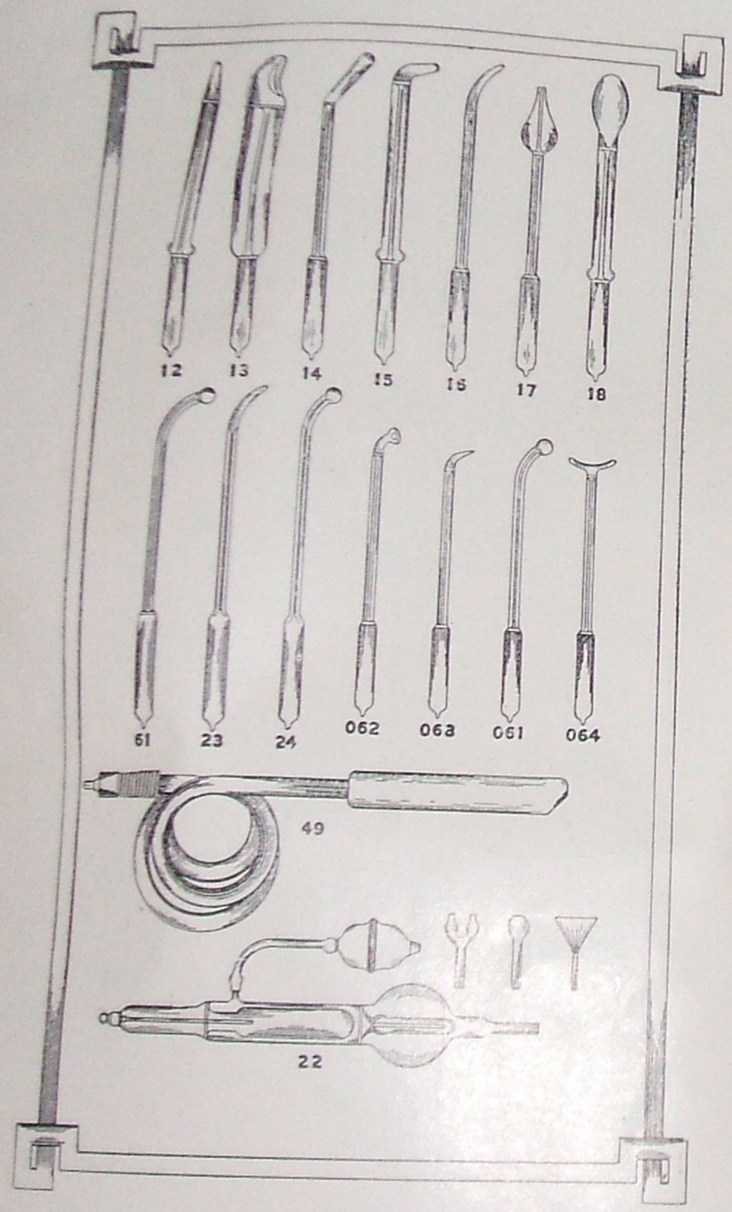
No. 483 Chiropodists' Outfit, consists of:
1 No. 479 Portable "F" Generator,
1 No. 1 Surface High Frequency Electrode,
1 No. 7 Bunion High Frequency Electrode,
1 No. 20 Fulguration Handle and 3 Tips,
1 No. 30 Corn High Frequency Electrode,
1 No. 50 Insulated Handle,
1 No. 51 Heavy Insulated Cord.
Code—ABLATE $32.50

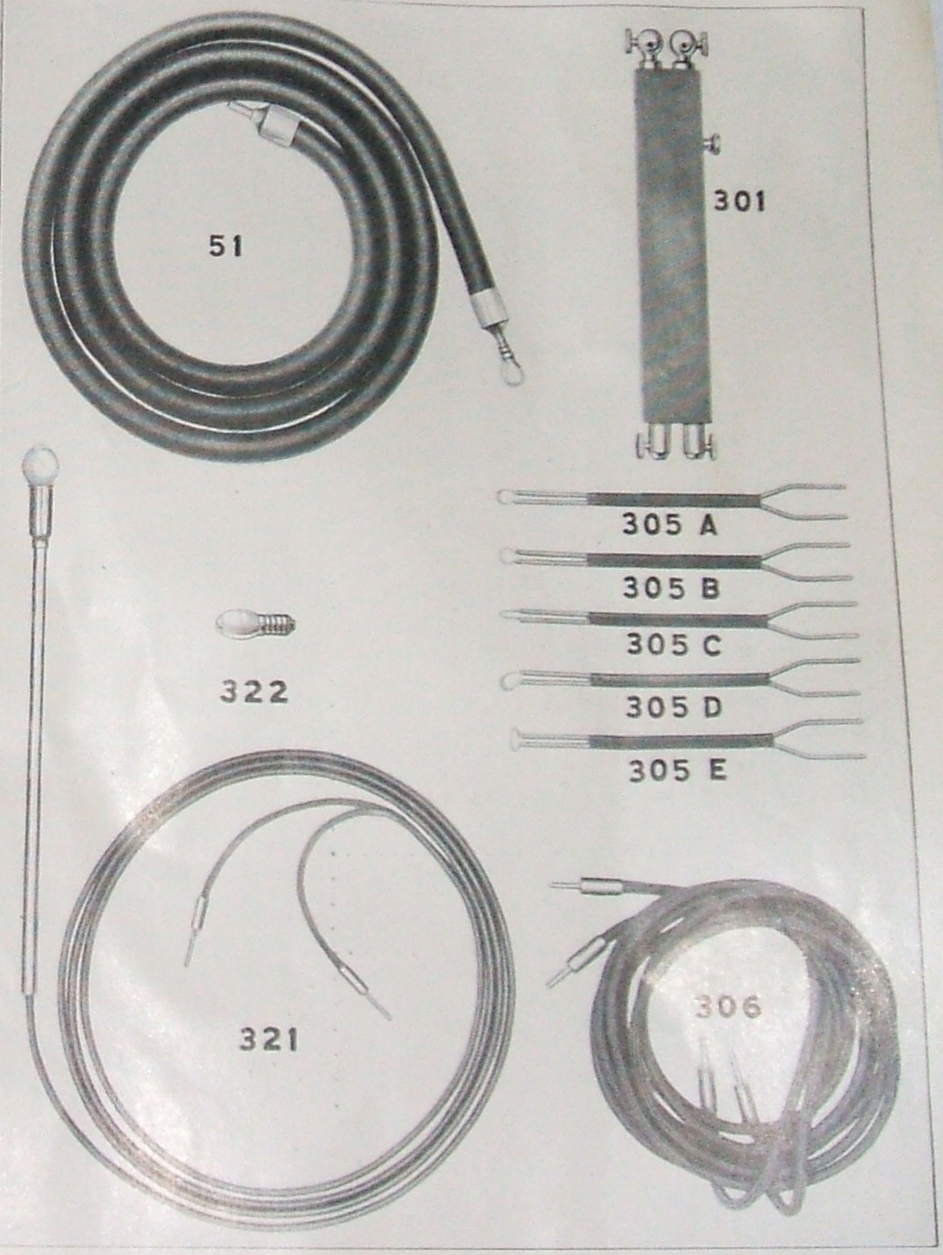
A Type "F" instruction Booklet is included in all of these outfits.

The following pages contain illustrations and prices of accessories that can be used with Type "F" Generator. They are all kept in stock and your order can be filled the same day we receive it.

We operate our own Glass Blowing Department and can furnish any other electrode desired, or we will make any special design from your blue print or sketch.




12
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23
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062
06a
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064
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301
305 A
305 B
305 C
305 D
305 E
322
321
306

Price List of Electrodes and Accessories

No.	Description	Code	Price
1	—Surface —Plain	Bacca	$ .75
2	—Rectal —Plain	Bagot	.75
3	—Vaginal —Plain	Ballet	.85
4	—Nasal —Plain	Balm	.75
5	—Throat —Plain	Baric	.75
6	—Urethral —Plain	Bark	.75
7	—Eye, Single —Plain	Barley	.75
8	—Eye, Double —Plain	Basal	1.25
9	—Metal Disc Body	Basic	3.75
11	—Comb (Scalp)	Batia	2.00
12	—Rectal —Insulated	Bazin	1.60
13	—Vaginal —Insulated	Beat	1.85
14	—Nasal —Insulated	Bed	1.60
15	—Post Nasal—Insulated	Beef	1.60
16	—Urethral —Insulated	Bela	1.60
17	—Inner Ear —Insulated	Belt	1.60
18	—Tongue —Insulated	Benzol	2.00
20	—Fulguration	Gadol	2.00
21	—Ozone Generator, only	Bidet	7.50
22	—Ozone Generator, complete	Bidwy	10.00
23	—Special Heavy Glass Urethral	Gull	1.00
24	—Special Heavy Glass Throat	Gum	1.00
25	—Cataphoresis	Binder	4.50
27	—Glass Fulguration	Guad	1.75
30	—Corn	Biogen	.75
33	—Outer Throat	Biotic	.75
34	—Spinal	Bite	.85
49	—Insulated Rubber Handle and Cord, ⅝"	Block	3.75
50	—Universal Handle, ⅝"	Bolus	1.00
53	—Glass Handle for Indirect Treating	Bismal	1.25
54	—Handle to Fit No. 49	Banter	1.00
61	—Throat—Insulated	Breath	1.50
62	—Insulated Dental Cocain	Bridge	1.50
63	—Insulated Dental Cavity	Bridle	1.50
64	—Insulated Dental Outer Gum	Brim	1.50
51	—Heavy Cord, 4' long	Gait	1.25
51-5	—Heavy Cord, 5' long	Hirtz	1.40
51-6	—Heavy Cord, 6' long	Hoche	1.55
51-7	—Heavy Cord, 7' long	Hodge	1.70
52	—Metal handle for indirect treatments, extra long	Carota	1.00

Electrodes and Accessories Continued

301	Cautery handle, adjustable to 5 positions	Acetyl	2.25
305	Cautery Knives, any shape	Acmea	.85
306	Cautery Cords, per pair	Achor	1.00
321	Diagnostic illuminator with cords, holder and Tungsten lamp	Analog	2.00

Portable Electo-Therapeutic Outfit Type "K"



This Apparatus Covered by Physicians Electrical Appliance Controls Patent No. 1260354

Here is a powerful, simple, practical and durable outfit, especially designed to fill the needs and meet the requirements of the physician who appreciates the value of the various modalities and recognizes that it is essential to have them available, but yet who does not wish to install one of the heavier cabinets, or wants a portable to supplement his office equipment.

Type "K" will be found to meet all requirements for such practice, and we can unconditionally recommend it to the profession as a high-class, dependable and economical piece of professional equipment.

For Fulguration The operator has the option of using the short Hot Sparks, or the longer Thin Sparks, which Desiccate but do not Cauterize.

Ozone By means of one of our small generating and filtering inhalers.

D'Arsonval For auto Condensation, in connection with the chair pad furnished, in gradual steps up to 650 Milliamperes. The exact amount of current being delivered to the patient can readily be ascertained by means of our Color Scale; also furnished.

Cautery Enough energy to properly heat any ordinary knife, of any manufacture. **Finely controlled.**

Diagnostic Any Voltage, from one-half to twelve, regulated accurately, can be used for illuminating your smallest cystoscope bulbs with perfect safety.

Sinusoidal with a wide range of regulation.

CONSTRUCTION

The case measures, when closed, 17 inches in length, 11 inches in depth and 8½ inches in height as it stands. It is very substantially built, being steel bound and covered with a good quality of black leatherette, which will outwear leather. The interior is lined with velvet. All the metal parts are made of brass, heavily nickel-plated, and are mounted on white Italian marble. Metal clips are mounted on the inside of the cover in such a way that there is abundant room for all the accessories which go with the outfit, as mentioned on the following page.

Portable Combination Type "K"

Furnished Complete as Follows

1		Type "K" with Connecting Cord and Plug.
1	No. 1	Surface High Frequency Electrode.
1	No. 2	Rectal High Frequency Electrode.
1	No. 3	Vaginal High Frequency Electrode.
1	No. 4	Nasal High Frequency Electrode.
1	No. 5	Throat High Frequency Electrode.
1	No. 23	Urethral High Frequency Electrode.
1	No. 50	Handle for High Frequency Electrode.
1	No. 51	Heavy Insulated High Frequency Cord.
1	No. 410	Auto Condensation Pad.
1	No. 411	Regulating Lamp and Clamp.
1	No. 412	Color Scale.
1	No. 52	D'Arsonval Handle.
2	No. 311	Sinusoidal Cords.
2	No. 312	Sinusoidal Handles.
1	No. 316	Spongio Handle and Disc.
1	No. 614	Hand Diathermy Electrode.
1	No. 321	Diagnostic Illuminator with Cord.
1	No. 322	Tungsten Lamp.
1	No. 301	Cautery Handle, Adjustable.
1	No. 305A	Cautery Knife.
1	No. 305B	Cautery Knife.
2	No. 306	Cautery Cords.
1	No. 20	Fulguration Electrode.
	3	Tips for Fulguration Electrode.
1		Booklet Instructions.

Arranged to operate on the 110-Volt, 60-Cycle, Alternating Current.

No.	Code	Price
Outfit 485T, with improved Tungsten Spark Interrupter Points	Ante	110.00

We Also Manufacture and Carry in Stock a Complete Line of ELECTRO THERAPEUTIC APPARATUS Which Includes the Following:

X-Ray Transformers
Auto Condensation Treatment Outfits
Auto Condensation Pads
Thompson-Plaster Electrical Cabinets
Diathermic Treatment Outfits
X-Ray Plates and Equipment
High Frequency Outfits
Portable X-Ray Generators
Diagnostic Light Regulators
Dental High Frequency Outfits
Portable Combination Outfits
Cautery Transformers
Cautery Equipment
Therapeutic Lamps
Dental X-Ray Equipment

Ask Your Nearest Dealer. If He Will Not Supply You, Send Your Order Direct

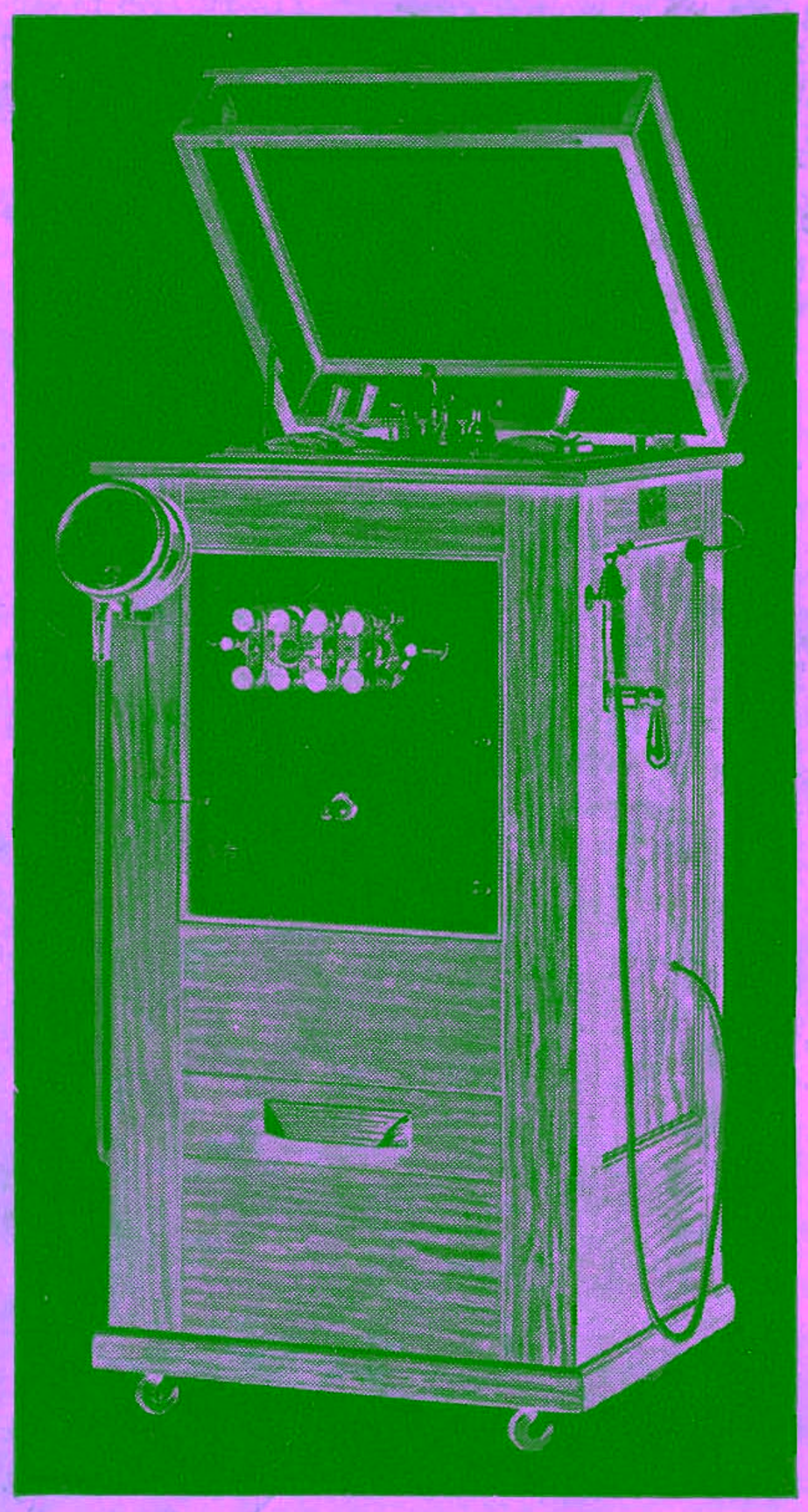
F

Whether Intelligence rules
all things or chance rules,
Man must use the power
that he has and
be Tranquil

Fischer
CHICAGO, ILL.

Fischer Combination Electro-physiotherapeutic Treatment Outfits

STYLE "FO" SENIOR
and TYPE "LO" SENIOR



Manufactured by

H. G. FISCHER & CO., Inc.

X-Ray and Physiotherapeutic Apparatus

2333-43 WABANSIA AVENUE CHICAGO

The Fischer Style "FO" Senior High Powered Treatment Cabinet

A handsome, impressive piece of office equipment, compact, simple in operation yet the most powerful machine of its type available, and capable of the finest kind of results.

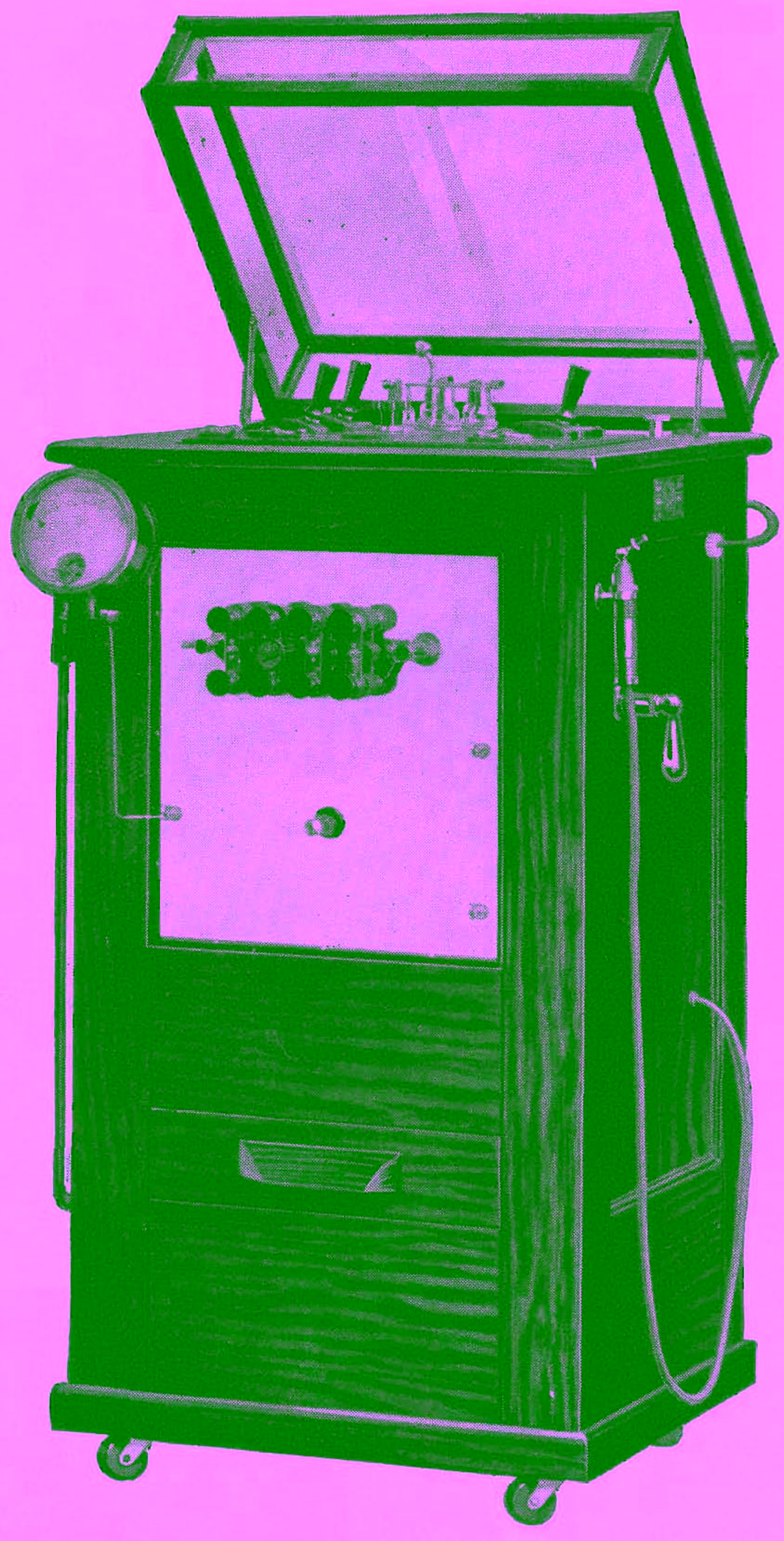
A modern, ethical method of treatment in innumerable conditions, and a business builder—it shows the progressive, up-to-the-minute spirit—and completes the service you may render.

The Fischer Style "FO" Senior serves over twenty purposes, all from one convenient cabinet:

Medical Diathermy,
Surgical Diathermy, (Electro-Coagulation),
Fulguration (Desiccation),
Arsonval Auto-Condensation,
High Frequency,
Cautery,
Diagnostic Illumination,
Sinusoidal,
Tankless Compressed Air,
Nebulizing Outfit,
Electric Heater for Air,
Electric Heater for Fluids,
Pneumatic Vibrator,
Vibratodes for all purposes,
Heat and Vibration,
Vacuum,

Vacu-Vibration, and other modalities equally valuable.

Diathermy (Medical) Diathermy, the latest development and unquestionably the most useful of the High Frequency modalities, is used in two distinct forms—Medical and Surgical—the outstanding difference being that while in the former we raise the temperature of the tissues within physiological limits, in the latter we far exceed this point and tissue is destroyed.



Catalog No. 1230. Style "FO" Senior Treatment Cabinet.

This modality is obtained in a similar manner to the D'Arsonval Auto-Condensation, but the method of application differs widely. Diathermy may be defined as a form of Thermo-Therapy which utilizes electrical energy for the production of thermal (heating) effects in the depths of the tissues.



Medical Diathermy Application to Knee

We all know the therapeutic value of heat. Poultices and the hot water bottle have been used since time immemorial, but before the advent of the "Diathermy" application all bodily heat (with the exception of that generated by the combustion of food) had to be applied from the outside—the outer shell received more than its share of the heat administered while the internal areas were practically untouched.

When applying Diathermy, however, the desired heat may be directed to precisely any area, the intensity of the application may be modified to suit the individual case, the patient feels no "electrical sensations," and the entire treatment consists of generating just the required amount of heat at the focal point necessary regardless of how deep in the tissues that point may be.

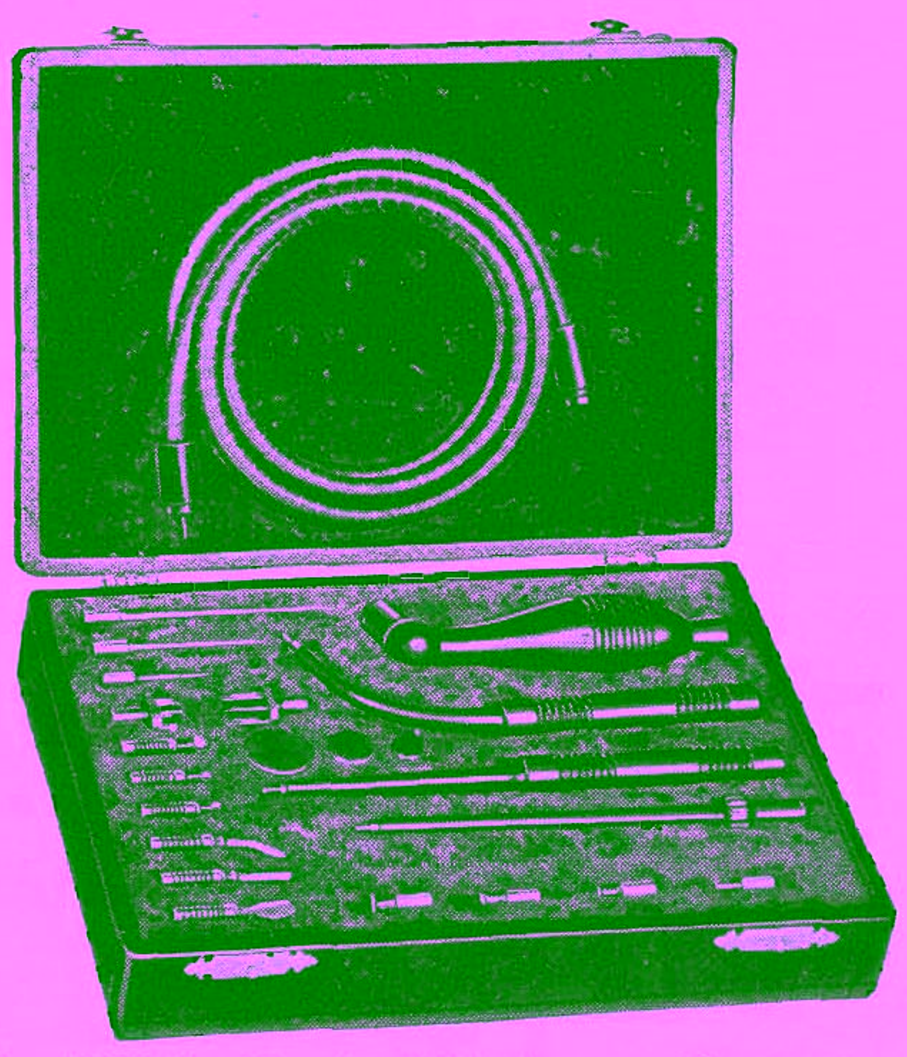


Application Diathermy to Chest

Diathermy, although one of the newer currents in Physiotherapy already has a host of enthusiastic followers. The process of altering tissue conditions with the Diathermy Current closely resembles Nature's own work, in that while the soft fibres, nerve cells and the blood are all good electrical conductors and therefore conductors of the heat generated during the treatment, and as fibrous tissues are not good conductors, it may readily be seen that the heating generates in exact inverse proportion to the conductivity of the tissues; the fibrous materials most and the good conductors least.

Diathermy (Surgical) (Electro-Coagulation) Surgical Diathermy is the application of High Frequency currents for destruction of tissues by the heat produced through the resistance offered by the substance through which the current is forced.

This method differs from all other applications of heat in that instead of the heat being sent inward from the skin, electrically or otherwise, it is *actually generated within the tissues*, and the temperature raised as desired to the point where actual coagulation takes place.



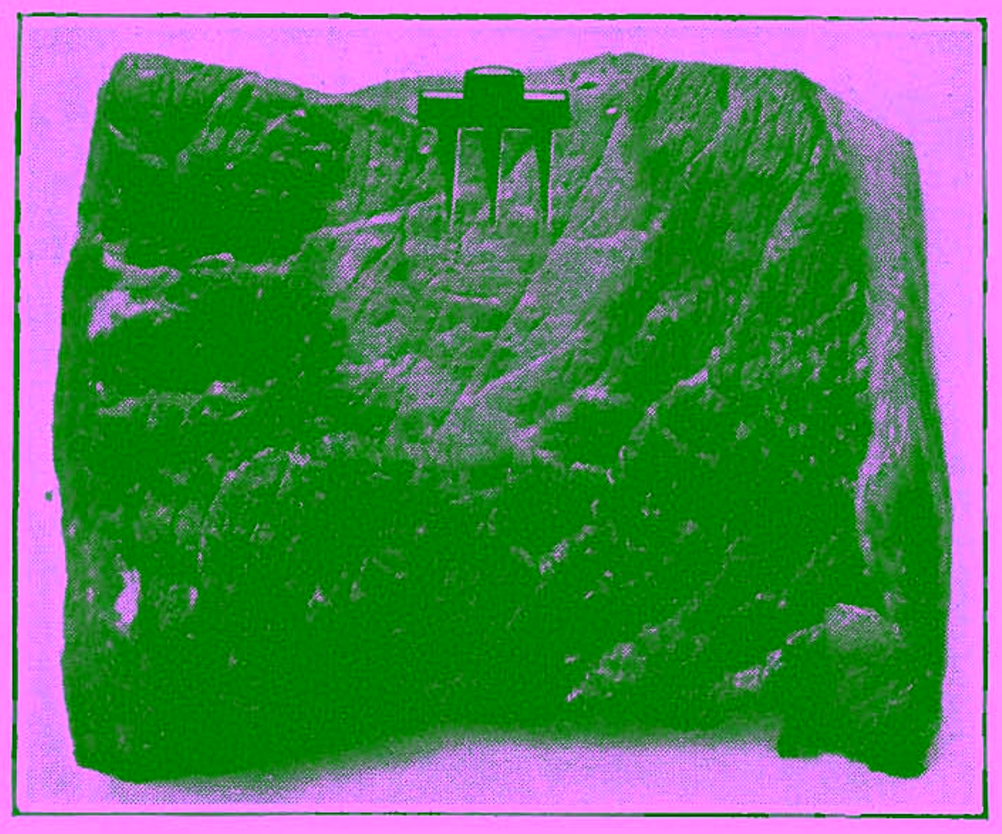
No. 1300 Set Surgical Diathermy Electrodes

Surgical Diathermy is used to advantage in cases involving malignant tissue —it is far superior to any other known method because of the fact that otherwise inoperable growths are successfully destroyed. The blood and lymph coagulate, the vessels are sealed and the infecting organisms annihilated.

The advantages of Surgical Diathermy are many: The operations are bloodless, there is little surgical shock, the parts involved are thoroughly sterilized, but little time is consumed, post-operative adhesions are rare and the patient convalesces rapidly.

Illustration—Surgical Diathermy Experiment

A piece of beef, measuring 3 in x 3 in. x 2½ in., was used in this experiment. The 5 pronged multiple needle electrode was forced down into the center until the flat section rested on the meat proper. The slide rod "J" was withdrawn two sections, the control lever set on point 3, and 1100 milliamperes passed for ½ minute, followed with ½ minute of 2000 M. A.



Result:—An evenly coagulated white appearing mass of tissue, extending 1⅜ inches deep and 1⅛ inches wide. No charring.

It is clearly a destructive process for coagulating to any desired depth, and there is practically no danger of metastasis in cases of malignancy.

Fulguration (Desiccation) This very valuable modality is the *Dehydrating process* as obtained from the Oudin Coil. The ordinary, direct, unipolar Fulguration application is a successful treatment for all accessible benign neoplasms of the skin and mucous membranes. Recommended for the removal of Bladder Papilloma, Lupus Vulgaris, Warts, Moles, etc.

D'Arsonval Auto-Condensation Auto-Condensation is the most popular High Frequency modality for treating all general toxic conditions. The constitutional effects are numerous, increases being noted in temperature and bodily heat, oxidations, secretions, eliminations, glandular activity and general metobolism. When hypertension exists there is a marked decrease in the blood pressure.

These currents are soothing to the entire system, and the effects of the application constitute what may be termed a cellular



Auto Condensation Treatment

massage. No sensation of electrical current is perceptible by the patient. The Style "FO" Senior Cabinet delivers a volume of this valuable current far in excess of any demands that you may make of it.

High Frequency Current Although this modality is applied to the patient at varied intensities from zero to thousands of volts potential, the Frequency, or rate of oscillations, is so rapid that no harm can possibly result from its use. On the other hand it affords a wonderfully beneficial treatment for both external purposes and in the orifices.

High Frequency applications dilate the blood vessels and increase the blood supply to a given area, increase oxidation and oxygenation, promote absorbtion of exudates and liberate ozone. They are most successfully used in the treatment of Abscesses, Acne, Skin Ulcers, Eczema, Enlarged Tonsils, Blepharitis, Uterine diseases, and for the relief of pain in Neuritis and Neuralgias.

The output of this modality is finely regulated—obtainable in any quantity.

Sinusoidal The Sinusoidal Current is sedative and analgesic. It is a valuable aid in Muscular Atony, Congestion of the Viscera, Intestinal Stasis, Atrophied conditions of the Muscles and Nerves, and sluggish circulation of the Venous Blood. It is used to good advantage as a means of exercising the muscles after the removal of the cast in fracture cases.



Application Sinusodial

The application is very simple, and a small assortment of electrodes may be used for a number of distinctly different cases. The Sinusoidal Current discharge from the Style "FO" Senior has a variation of from 3 to 45 volts.

Cautery The Style "FO" Senior Cabinet delivers a cautery Current with sufficient range of power to heat any ordinary cautery knife. Capacity 100 amperes. Under perfect regulation, and invaluable for cutting and sealing purposes, Nasal Hemorrhages, and opening Boils.



Application Cautery

Diagnostic With a range of from 2 to 12 volts. Finely regulated and with sufficient scope for the lighting of all special cystoscopes and mouth lamps as well as the illuminator furnished.

Motor and Pump Another excellent feature of the Style "FO" Senioris the Motor and Pump attachment, furnishing both Pressure and Vacuum—for nebulizing and vibration, and for cupping and vacuum-vibration. Pure air is

pumped as needed, delivered uniformly at the desired pressure, eliminating the laborious hand pumping and tank of more or less stale air.

By the mere turning of a handle this steady pressure is changed to one of rapid pulsations, thus providing a true pneumatic vibration; less noisy, and having considerably longer life than the ordinary mechanical device. A full set of vibratodes is included for all surface and cavity work.

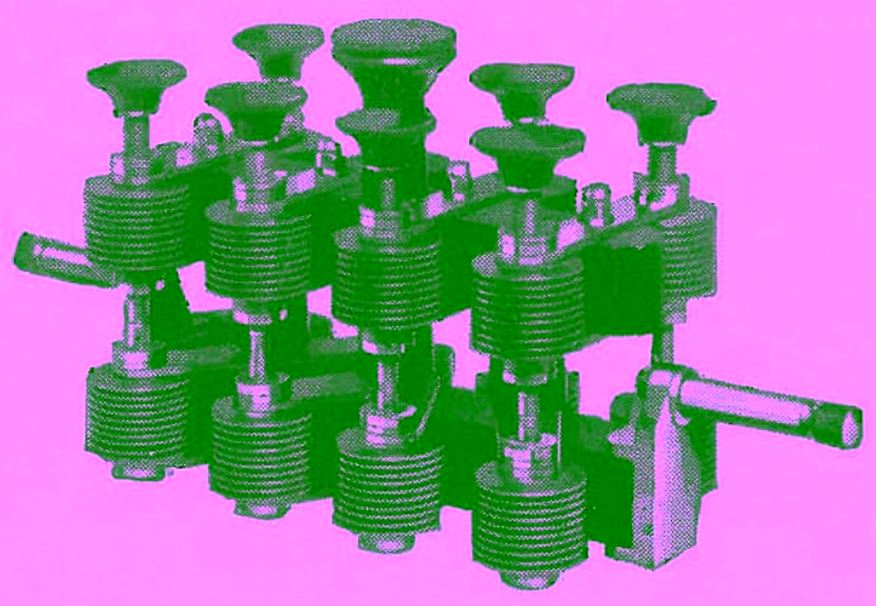
There is sufficient vacuum for all cupping purposes, and any appliances ever gotten up for use with the Dr. Bier method of producing hyperemia can be successfully used with this cabinet. The vacuum may also instantly be altered from steady to pulsating, for vacu-vibration.



Application of heated air to ear

Multiple Spark Gap

The Style "FO" Senior Cabinet is equipped with an especially designed Spark Gap of the multiple type, of 8 sections (16 points). This "*Kolischer*" Gap is wonderfully smooth in action, has adequate copper flanging to carry away all heat, each pair of Tungsten points may be adjusted individually or collectively (by individual button or master controller), and the parts are easily replaced when required.



This gap is the utmost in flexibility, insures more constant discharge at any setting, the regulation is very gradual, and a perfectly controlled *sedative* Diathermy dosage may be administered.

The Transformer The Style "FO" Senior Cabinets are constructed with Oil insulated transformers only. The *Oil insulation* permits of continual operation without the slightest danger of breakdown or lessening in efficiency.

The very ingenious method of winding and construction employed in the coils permits of a greater variety of voltage steps than has been possible in any apparatus heretofore. There is a very *low voltage* output at an extremely high rate of frequency and high milliamperage for *Electro-coagulation* purposes; a somewhat higher voltage but equally high amperage for *Medical Diathermy*; a still higher voltage for D'Arsonval's *Auto-condensation*, and a very high voltage at a high rate of frequency for the *mono-polar* (*Oudin*) discharge.

The General Construction The latest and most approved type of construction is used throughout: all the wiring is well protected; the switches are heavy, and of the safety "enclosed" type; an auto-transformer with 16 points of control is employed, insuring continual operating service and the finest of regulation; the pilot (warning) lamps are mounted under ruby glass protectors; there is a selector switch at the side that any voltage may be obtained at will without disturbing connections to the patient, and a well insulated Foot-switch with cut-out is provided.

The Cabinet The entire equipment is mounted securely in a handsome cabinet, finished as specified on your order, with ample drawer space for the accessories furnished. *Mahogany will be furnished unless specified otherwise.* The Style "FO" Senior Cabinet can be supplied in other finishes—Golden Oak, Mission or Fumed Oak at the cataloged price, and in White Enamel at a slightly increased cost.

Guarantee The Fischer Guarantee is liberal, and in perfect keeping with a manufacturing and selling policy deemed fair by the medical profession today.

Catalog No. 1230—Style "FO" Senior Physiotherapeutic Apparatus, with *Oil* Insulated Transformer, mounted in handsome Cabinet finished as specified, with individual windings and outlets for Low Voltage Surgical Diathermy (Electro-Coagulation), Medium Voltage Medical Diathermy, D'Arsonval Auto-Condensation, Fulguration, High Frequency, Cautery, Diagnostic and Sinusoidal circuits, an Electrical Motor with Two Cylinder (opposed type) Pump attached, connecting Cord and Plug, Rubber Tubes with Vacuum and Pressure Handles, and:—

1	No. 450	Milliampere Meter.
1	No. 455	Milliampere Meter Support.
1	No. 460	Meter Connecting Wire.
1	No. 1222	Multiple Spark Gap (Kolischer Type).
3	No. 1330G	Rubber Covered Diathermy Cords, 6 ft.
1	No. 83	Heavy High Frequency Cord.
1	No. 1205	Insulated Foot Switch with 8 ft. Cable.
1	No. 862	Insulated Electro-coagulation Electrode with Cable.
2	No. 614	Hand Diathermy Electrodes.
1	No. 847	Flexible Mesh Electrode, 6″ x 6″.
1	No. 848	Flexible Mesh Electrode, 6″ x 8″.
2	No. 851	Mesh Connectors.
2	No. 840	Pounds Sheet Block Tin for Electrodes.
2	No. 688	Clips for Block Tin Electrodes.
2	No. 854	Yards Elastic Bandage.
1	No. 865	Multiple Cord Connector.
1	No. 880	Empty Sand Bag (5″ x 15″).
1	No. 876	Can Soap Lather.
1	No. 420	Heavy Auto-condensation Couch Cushion.
1	No. 58	Metal D'Arsonval Handle (1½″ x 14″).
1	No. 9	Metal Disc Body Condenser Electrode.
1	No. 4	Nasal High Frequency Electrode.
1	No. 12	Insulated Rectal High Frequency Electrode.
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1	No. 23	Capillary Glass Urethral Electrode.
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1	No. 301	Cautery Handle (adjustable to 5 positions).
1	No. 305A	Cautery Knife.
1	No. 305C	Cautery Knife.
1	No. 316	Spongio Disc and Handle (sinusoidal).
1	No. 321G	Diagnostic Illuminator.

(*Balance of list on next page.*)

1	No. 322	Extra Diagnostic Lamp Bulb.
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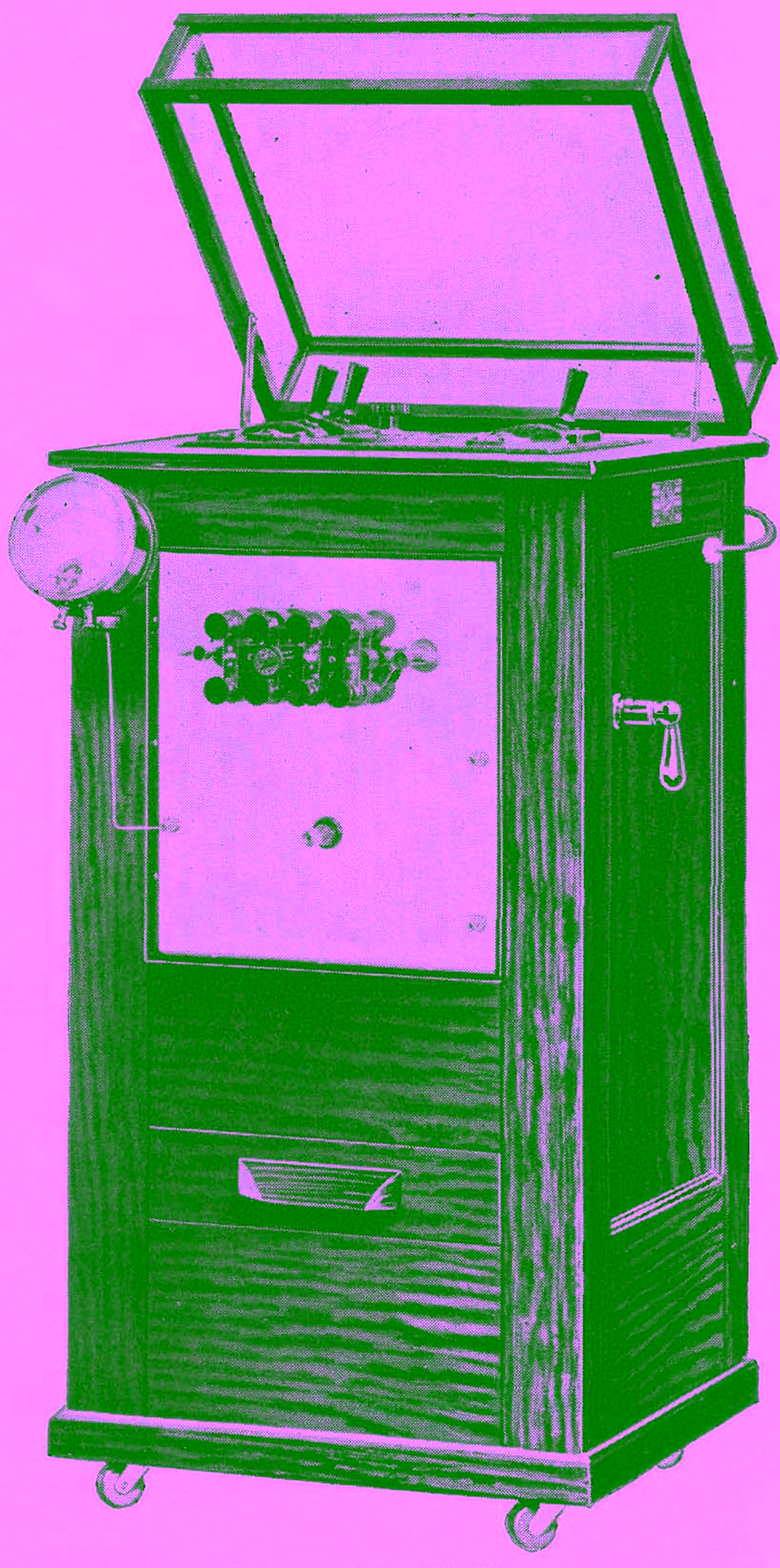
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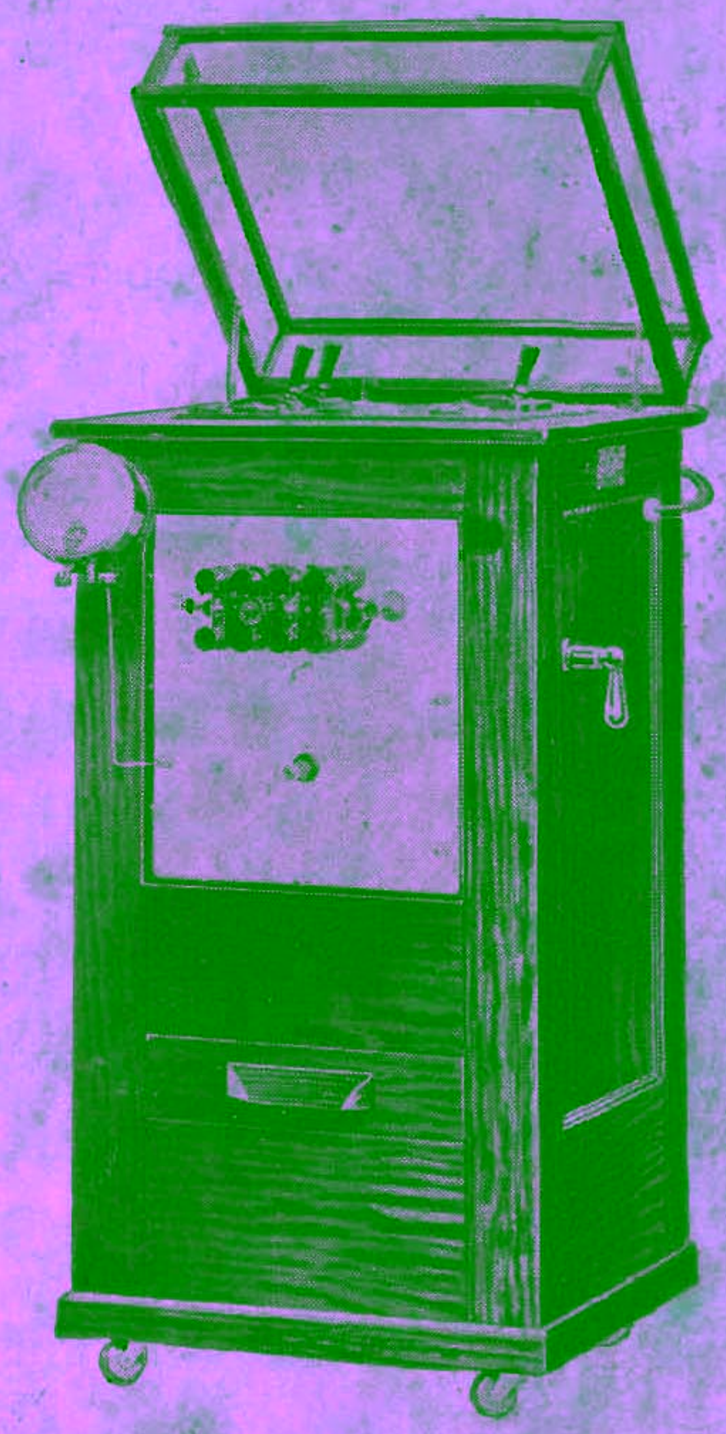
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(ABSTRACTS)

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Discussion of Galvanism

By J. U. GIESY, M.D., Salt Lake City, Utah

IN considering the galvanic current, the first thing we should understand is that it is indeed the "parent" current from which practically all other type currents are derived. Originally obtained through chemical action in electric cells, it is still the only truly chemical type of current which we employ, though nowadays it is produced by mechanical means from machines constructed on a low voltage principle to deliver a current of this type.

This chemical quality of the galvanic or direct current as it is more properly called, depends upon the fact that it is literally what the latter name implies. That is, it is a current flowing constantly in one direction between two individual poles. One may compare it to a stream flowing down a gentle incline. The stream does not retrace its course, and the direct current does not reverse itself. It is upon this characteristic that its outstanding use in electrical medicine depends.

There is therefore nothing mystical about the direct current. There is nothing different about it from any other type of electrical current now used in the treatment of pathological conditions, save this: That it never changes its polarity, and hence may be called upon to produce polar reactions of a predetermined nature wholly dependent upon the choice of poles.

This characteristic, which insures a standard reaction, according to the polar selection, is known as polarity. Polarity may therefore be defined as the individual characteristic of the pole of choice. And the prime essential in the use of this current in an intelligent fashion is a well-grounded conception of the individual polar quality together with the bio-chemic tissue reactions which its application may be expected to evoke.

Roughly speaking, the body is a sack of chemicals in an aqueous suspension—hence an electrolyte. The galvanic current has the ability to break down these body chemicals into their constituent elements. Through and because of this action we obtain definite chemical effects whenever it is employed.

Let us then list briefly the known and recognized characteristics of the two poles.

The positive pole is vaso-constrictor. It contracts the blood vessels and hence narrows the circulatory path. Through this action it inhibits hemorrhage and subsides inflammation. And because of the latter action it relieves pain from an inflammatory source. In addition it has a toning effect on the tissues to which it is applied. It is dehydrating in its effect with a resulting tendency to reduce tissue exudates. It produces an acid reaction in the tissues surrounding the pole and in sufficient concentration will destroy tissue, leaving behind it a dry eschar of the acid type. It repels or drives away from itself certain chemical substances, such as metals and alkaloids. It is this latter action, through which it is possible for this current actually to introduce these chemicals into the tissues, which is today denominated ionization—a procedure for which the galvanic current is and may well be extensively employed.

As for the negative pole, its action is directly opposite. Actually the two poles are complete antagonists. Consequently in employing the negative pole, we may expect it to widen the blood stream by acting as a vasodilator, hence to increase blood flow to a part, increase hemorrhage and drainage and inflammation, and increase pain of an inflammatory type.

It relaxes tissues and relieves contractures and softens scar tissues. It promotes exudates. It sets up an alkaline reaction in the tissues about the pole and destroys tissues by a process of alkaline caustic action, leaving a soft eschar as the end result. It ionizes acids and the halogen group of chemicals and is employed for this purpose whenever such action seems advised.

And now let us summarize. Whenever you wish to soothe, whenever you wish to restore tissue tone, when you desire to check bleeding or inflammation; whenever you seek to introduce metals or alkaloids into locally affected tissues, or to change the chemical reaction of those tissues from an alkaline to an acid reaction, or to destroy them with an acid type effect, the positive is the pole of choice. When you wish to produce the opposite effect, the negative pole becomes the means of choice.

Here then is the "bible" of galvanism in a few words. If one learns the actual chemical effects of the current, one has laid the foundation for its use in the curative attack. Everything outside it then becomes but the application of the unchanging function of the two poles, plus a knowledge of their indications and the workmanship and ability to use them. It sounds simple and it is simple so long as intelligently employed.

Let me suggest that the beginner "break down" the listing of polar characteristic action given above into two separate columns and study them in that form until he has fastened them firmly in his mind. When he has done this he will begin to see far more clearly how so many of the conditions by which the average physician is daily faced, may be met by this one current with every expectation of a satisfactory result.

And to point the moral as it were, let me take up a few of the conditions in which the galvanic current may be employed and indicate in each instance the technic, the pole of choice for treatment or possibly both.

In the menorrhagias and metorrhagias, the positive pole should be tried. Naturally you as physicians will consider the patient's general condition. But with that understood the response of these two groups of cases to local use of the positive pole inside the uterus will be both gratifying and surprising.

In fibroids of not too long standing or major size the same pole applies. Dozens of these cases will respond to intra-uterine positive galvanism with a recession of the tumor-mass, a cessation of bleeding, and a restoration of normal function, thus saving the patient from the risk of surgical intervention and leaving her anatomy intact.

In uterine displacements, the majority of which are due to loss of tissue tone in the uterus or its supports —once more the positive pole through its ability to tone and firm the tissues is the pole of proper selection and will aid the return of the organ to position in cases in which other factors do not militate against the result. In subinvolution this is true also and you may depend upon positive galvanism to deliver rapid and excellent results. Again let me stress the need of seeing the patient's general condition supervised.

Still in the field of the female pelvis, let us look at the line of attack in inflammatory processes in which the acute stage is passed. Here we have actual or early fibrosis. Old cellulitis, old salpingitis cases for example may be successfully attacked. Here the negative pole is to be selected in order to bring about a softening of the tissues with an absorption of old inflammatory products and a renewed tissue flexibility with symptomatic relief.

Turning to the male urethra, stricture may be attacked by the following technic. With an olive tipped male electrode and the negative pole

as the one of choice, the patient is placed upon a large positive pad electrode placed beneath his hips, and the urethral electrode is threaded down the urethra till contact with the constricted area is made. The current—five to ten milliamperes, according to the patient's tolerance, is now turned on. Little force is used. Merely enough to keep the olive tip in contact should be employed. By degrees the softening effect of the negative pole is produced by an electrolytic action and you will feel the electrode advance. When the stricture has been penetrated by the first tip employed, a larger one is selected and the process continued until a satisfactory calibre is reached. Treatments should not exceed fifteen minutes and should be repeated every second or third day and urethra should be instilled with a weak silver salt at the end of the seance each time in order to prevent local reaction in so far as we may.

The effects of this current in its function of ionization is something which none of us should overlook. Especially in the nose, in sinusitis and in intractable abscess cavities, results are at times spectacular, to say the least.

In rhinitis, zinc ionization using a nasal packing saturated with a two per cent zinc sulphate solution, and activated by the positive pole with a five milliampere current for from seven to ten minutes will bring about a rapid cessation of symptoms. In ethmoiditis the same pole should be used, save that here we employ a slender silver sound wrapped with a very thin layer of cotton, dipped in the zinc solution and threaded well up into the ethmoid zone. These cases which so frequently result in an inability of the supra-orbital sinuses to ventilate themselves can be rapidly cleared by this simple technic alone.

In otitis media of a chronic type, with a ruptured or perforated tympanum and where the mastoid is not involved, the use of positive pole zinc ionization will frequently give the happiest of results and should certainly be tried.

In intractable abscess cavities and sinuses, zinc ionization with the positive pole will in the larger per cent of cases bring about healing. Here the cavity is filled with the solution, the current is carried in through a zinc tipped electrode and a current of from five to fifteen milliamperes is used. Dosage is regulated by the time multiplied by the milliamperage and not less than seventy milliampere minutes should be used. Example: Five milliamperes will require fourteen minutes to give the required dosage. Ten milliamperes will deliver the same dose in half the time or seven minutes.

The same technic applies to chronic empyemas, where resection has been done and drainage still persists. Using the sinus of drainage as a portal of attack we introduce first the solution and then the tip of our electrode, just far enough to contact the solution and not to contact the lung. The patient lies on a large negative pad on the other side of his chest and the current is turned on. Actually here we are taking advantage of the principle of electro-plating and are depositing zinc ions on and in the tissues of the abscess wall to bring about a destruction of both the infecting agent and a breakdown of the pyogenic surface with a resulting healing.

In post traumatic injury to both nerve and muscle the galvanic current finds another field of use. Nothing will do more to tone up both these tissues, and lift them from a subnormal to an improved function than this current properly used. As to a choice of pole, a question here arises, but I feel that it may be decided largely by a consideration of the tissues involved. In other words if we wish to bring about a regeneration of nerve tissue, or stimulate the function of nerve tissue it is best to

imitate the natural nerve current flow and use the negative pole as the distal point of contact. If the muscle is chiefly at fault it makes little difference which pole is employed over the distal part so long as the entire muscle is caught in the sweep of the current. Yet even here I customarily use the negative pole as the activating agent with an interrupted current wherever I desire to cause the muscle to contract. If the effect desired is merely a galvanization of the muscle body, then either pole may be placed over the distal point to complete the circuit. This point may be stressed by pointing out that it is in this type of cases that the modification of the galvanic current customarily known as the sine wave is used. Owing to the balanced reversal of the polarity in the sine current, the effects of polarity are to all intents and purposes wiped out. Facial paralysis is a condition in which the use of this current with the positive pole over the mastoid or just in front of the ear and the negative pole over the distal distribution of the seventh nerve will give excellent results.

Owing to its ability of stimulating either striped or unstriped muscular tissue, the galvanic current has a field of application in restoring the tone of intestinal muscle, and is hence to be employed in the atonic types of intestinal dysfunction, resulting from ptosis, or personal neglect of the bowels. Here stimulation of the intestinal tube with an interrupted current and a negative electrode of the carbon ball type in the rectum, the positive pole being applied over the hepatic and splenic flexures will frequently give surprisingly good results.

I have purposely sought in this discussion to refrain from any fulsome claims. But I am speaking from an experience of over twenty-seven years in such claims as I have made. There are many other applications of this current on which I have not even tried to touch. Once accustomed to its use, one will find its availability more and more multiplied. In the rapid healing of fissures of the anus alone, without operation or any other means than the use of a slender bit of zinc clamped into a holder and laid in the depths of the fissure until the positive current has had time to whiten the walls and bottom of the lesion, one finds a striking demonstration of one of its minor applications, which I cannot refrain from enumerating as I close.

And now a last word. Polarity is the secret of success. You must know your poles — their quality — what each one does. You will then see the indication for each in actual use. And if you get this firmly founded in your understanding; if you remember to be doctors first, always, and never consent to be anything else; if you use your medical knowledge to show your patient's need and then use your knowledge of the galvanic current to supply that need, where it is the indicated remedial measure; then I can promise you, from a long and successful demonstration in my own employment of it, that both you and your patient will be pleased. The proof of the pudding is in the eating. It is the END RESULT that counts.

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The Treatment of Hemorrhoids by Galvanism

By Frederick Harvey, B.Sc., Ph.G., M.D., F.A.C.S., Chicago, Ill.

Reprinted from Clinical Medicine and Surgery, Vol. 42, No. 12, Dec., 1935, pp. 596-601.

The Treatment of Hemorrhoids by Galvanism

By Frederick Harvey, B.Sc., Ph.G., M.D., F.A.C.S., Chicago, Ill.

THE galvanic treatment of hemorrhoids is not new, having first been used in 1867. In 1892 Dr. Baker read a paper, "The Treatment of Hemorrhoids by Electricity." Since that time it has been used by many doctors and the technic greatly improved.

Hemorrhoids are to be found in all climates, in all lines of occupation, in both sexes and in all ages, although they are more prevalent in the late twenties and upward. The word "hemorrhoid" is derived from a Greek word meaning "flow of blood." The word "pile" comes from the Latin "pils," meaning "ball."

As in making a success of any undertaking, it is essential that the operator pay special attention to the fine details; that is, he must know the normal anatomy of the rectum and anus, take a complete history, make a thorough examination, and give careful attention to the equipment and minute details of the treatment.

Haynes reports that, in 1866, Althaus made microscopical observations of the changes in animal structures due to the electrolytic action of the negative galvanic needle. He found that the tissues were markedly contracted and that there was neither inflammation, suppuration nor sloughing. When the current was applied to the blood vessels they became changed into solid strings, due to disintegration of the blood and deposition of lamellated fibrin. He concluded that no animal tissue can withstand the disintegrating effect of the negative pole; that the force and rapidity with which disintegration is brought about are directly proportional to the strength of the current and to the softness and vascularity of the structures; that the current could be safely and successfully applied to contract and disintegrate tissue and obliterate blood vessels for surgical purposes.

When applied to hemorrhoids, the negative pole produces first a hydrolytic decomposition and then a contraction of the tissues. Webb[1] states that electrolytic destruction of the *vasa vasorum* is highly significant. Actual obliteration of the thrombosed mass is accomplished in one of two ways: it either absorbs, as occurs in any simple contusion; or, if a large, thin-walled hemorrhoid is treated, it ruptures, causing a discharge of the thrombosed elements into the rectum. Following this, there is contraction of the underlying tissue, with hemostasis, absence of pain and rapid healing of the parts.

A thorough knowledge of the anatomy of the rectum is necessary to understand the etiology, diagnosis and newer treatment of hemorrhoids. Figures 1 and 2 are introduced to refresh the memory, not to replace the textbooks on anatomy.

Classification

(Figure 3)

Hemorrhoids are classified according to their point of origin and location.

1.—The internal hemorrhoid has its point of origin internally or above the papillary line, is covered with mucous membrane, and has its origin from the superior hemorrhoidal veins. It is connected with the portal circulation.

2.—The external hemorrhoid is covered with skin and is located mostly external to the external sphincter muscle.

3.—The mixed hemorrhoid is a large internal hemorrhoid that extends down past the papillary line to the external sphincter and has some of the characteristics of both internal and external hemorrhoids.

Internal hemorrhoids

1.—*First degree:* Do not come external to the external sphincter during strain at defecation or at any other time.

2.—*Second degree* (Fig. 4): They are expelled partly external to the external sphincter during strain at defecation or by walking. However, they are easily returned to their site of origin.

3.—*Third degree:* They are expelled partly external to the external sphincter and become congested, so that they can not be returned by the patient.

External hemorrhoids

1.—Thrombotic.

2.—Skin tags.

3.—Varicose.

Mixed hemorrhoids

Hemorrhoids that extend from the veins above the papillary line to veins overlying the external sphincter, including a plexus of all three hemorrhoidal veins.

Examination of the Patient

A careful history of each patient is very important, just as if he came complaining of any other illness. He should be given a complete physical examination, including blood examination and urinalysis, which will greatly

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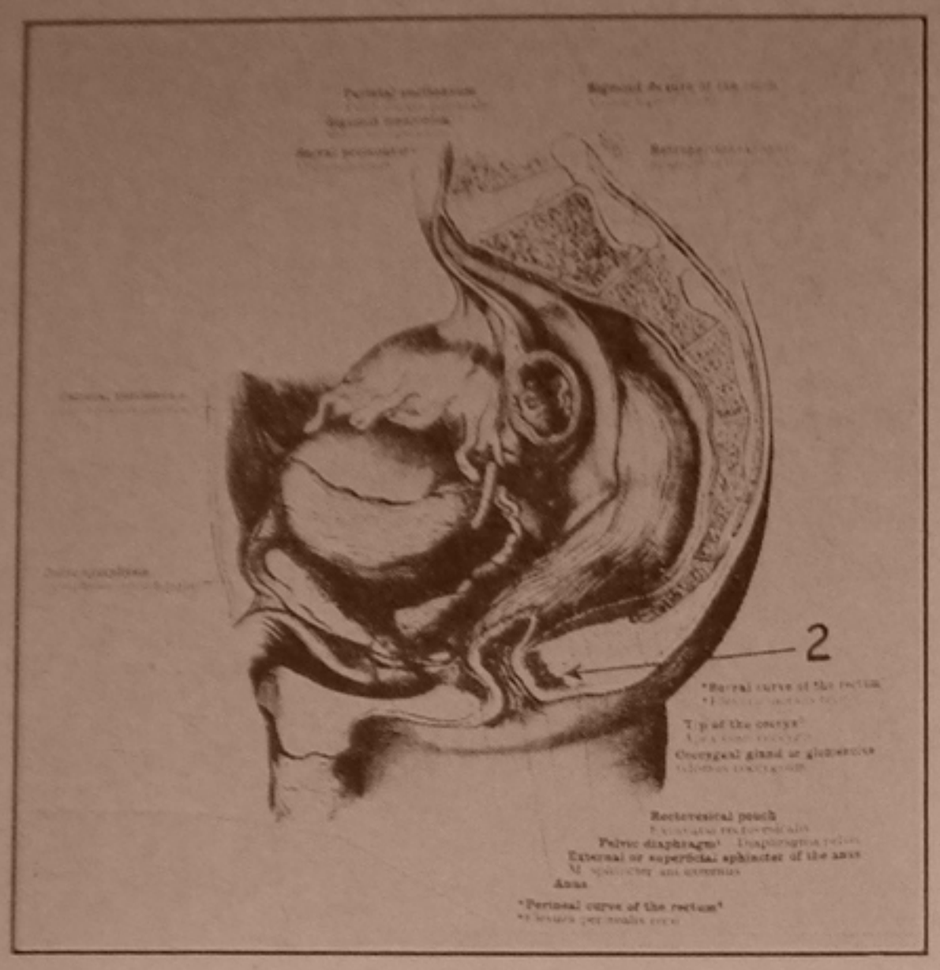


Fig. 1.—Median sagittal section through the pelvis, showing the anal canal directed superiorly and anteriorly for a distance of practically two inches. Then it turns at right angles and courses backward, lying on the coccyx and sacrum. (2) Shows the external sphincter muscle (Toldt).

aid the doctor in determining the etiologic factors producing the hemorrhoids, and whether any other illness is present accompanying the rectal pathosis.

Usually a complete bowel movement is all that is necessary before a rectal examination, but if the rectum has not been completely emptied an enema should be given. It is advisable to wait two or three hours after the enema has been given before attempting examination, as some patients require considerable time to completely expel it. Examination or treatment before the rectum is completely emptied may cause contamination of instruments and table, and the operator will be unable to see the structures properly.

A careful digital examination should be made, using the index finger, with a rubber glove or finger cot, and plenty of vaseline. If the anus is tender, Nupercaine ointment should be used in place of vaseline. Slowly insert the finger anteriorly and examine for enlarged veins, ulcers, carcinoma, polyp, and also the condition of the coccyx. Internal hemorrhoids cannot always be detected by digital examination; in other words, it is necessary to examine the rectum with a speculum in order to determine the presence and extent of internal hemorrhoids. It will be necessary for the operator to examine many normal rectums and many hemorrhoids of all types, as well as fissures, fistulae, polyps, tags and cases of pruritus ani, before he will be able to determine the normal and particularly pathologic conditions.

Speculum examination of the rectum follows digital examination, and we have a special speculum, as shown in Figure 5. Cover the tip of the speculum with vaseline and insert it very slowly, with steady pressure, directly forward for about two inches, after which the speculum is directed back toward the hollow of the sacrum. Withdraw the obturator and inspect the rectum for any pathoses of the colon and any sign of inflammation, ulceration or cancer. The speculum is then partly withdrawn, so that the lower part of its hollow extends down to the papillary line. If a hemorrhoid is present, it will distend into the gap of the speculum. They are usually light-blue in color, depending upon their size and duration.

The size can be determined by the degree

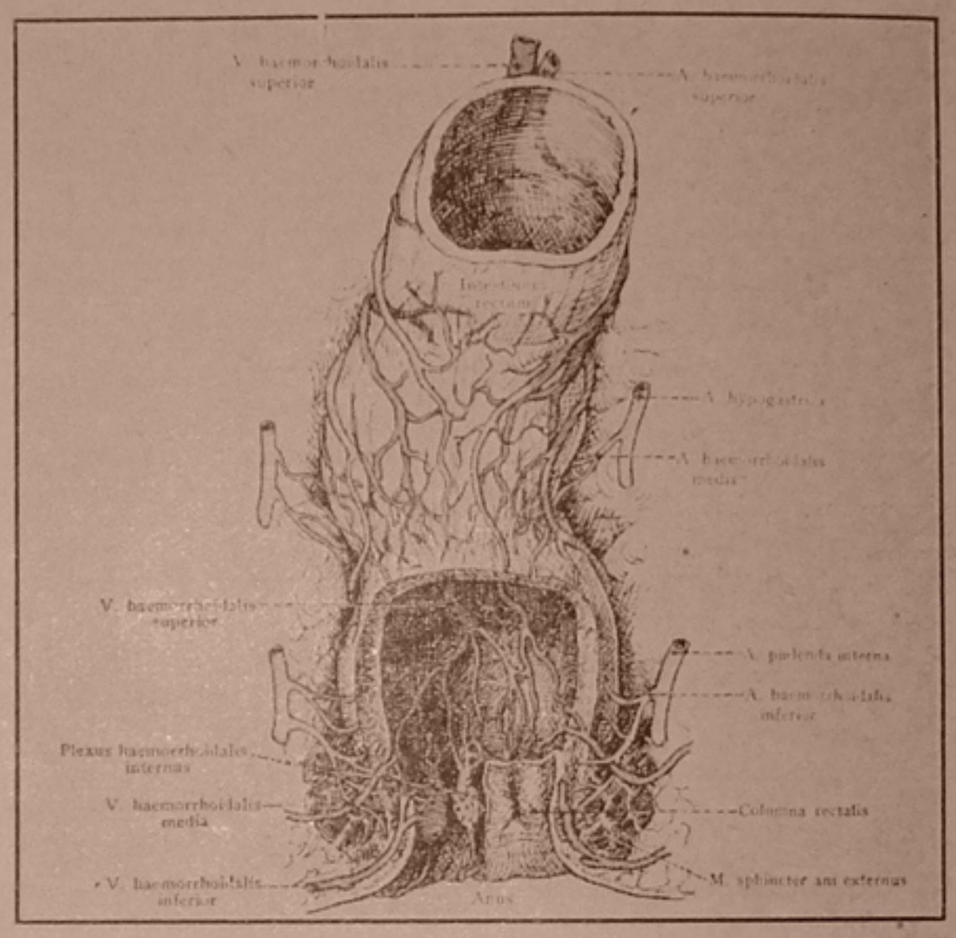


Fig. 2.—The blood supply of the rectum. A portion of the anterior wall has been cut away to show the rectal columns and the internal hemorrhoidal plexus (Eycleshymer and Jones).

to which they fill the speculum, many being large enough to fill it entirely; medium-sized hemorrhoids fill the speculum to a lesser degree; and small ones protrude into it only slightly. To examine other sides of the rectum, reinsert the obturator to push hemorrhoid out of speculum, turn the speculum and withdraw the obturator. If the speculum is turned while the hemorrhoid is prolapsed in the slot, it is usually painful to the patient and sometimes causes the hemorrhoid to bleed.

At times, it may be advisable to have a gastro-intestinal x-ray examination—an opaque enema with fluoroscopy or x-ray films. Special examination of the gallbladder and liver and special examination of the pelvic organs, in female patients, are sometimes necessary in determining the presence of pathologic conditions in the abdomen, associated with or independent of the rectal pathosis.

Equipment

1.—A galvanic machine which produces absolutely smooth galvanic current, to insure

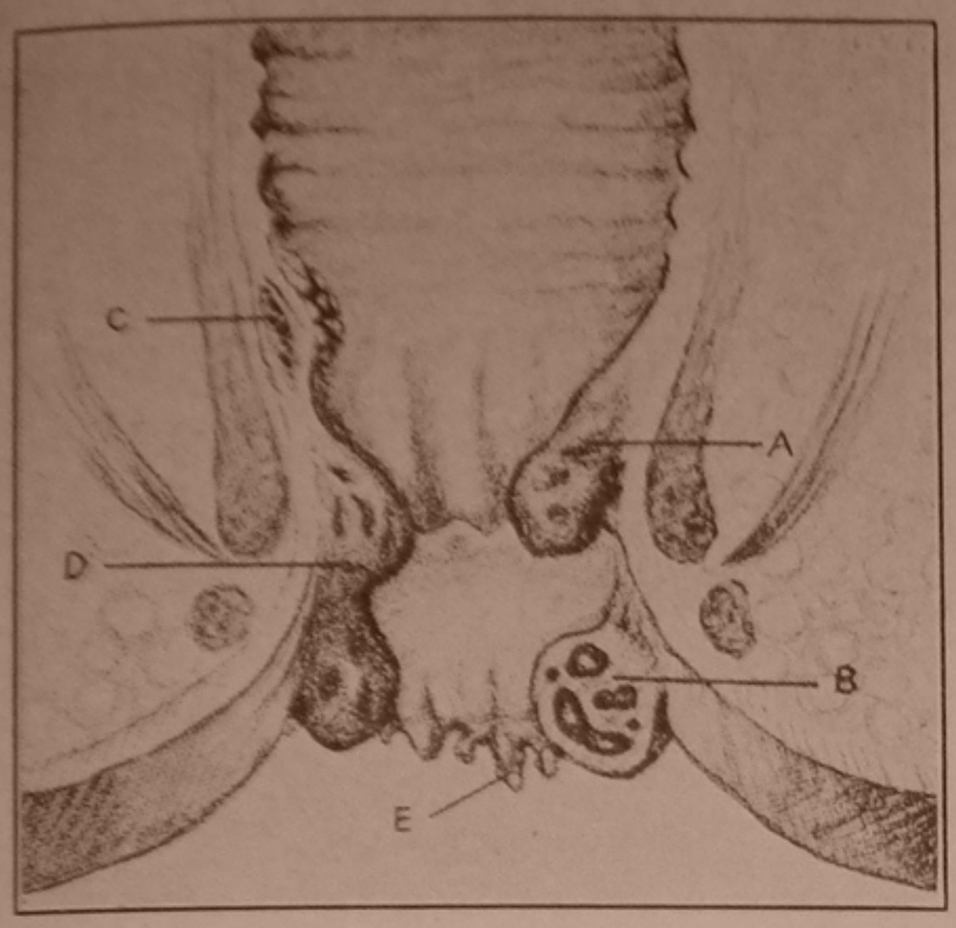


Fig. 3.—Schematic composite longitudinal section of the rectum, showing the locations of the various types of hemorrhoids: (A) Internal venous or varicose hemorrhoid; (B) External thrombotic hemorrhoid; (C) Capillary, strawberry or nevoid hemorrhoid; (D) Mixed or intero-external hemorrhoid; (E) Skin tabs or tags (connective tissue hemorrhoid) (Goldbacher).

comfort to the patient so that he can stand a high milliamperage. This produces a better treatment in less time. If the current is rough, however, the patient will experience discomfort and pain, and will not be able to stand high enough milliamperage to give satisfactory results.

2.—A 5x8 inch pad, which should be very moist, or poor contact with the patient will result.

3.—A galvanic needle, which comes in three sizes, and a handle for it. The needle is insulated with bakelite and has an insulated shoulder one inch long. No part of the needle is exposed except the tip, when the needle is inserted in the handle. Tips come in ⅛, $\frac{3}{10}$ and ¼ inch lengths, and the shoulder of the needle is especially constructed to hold all of the hydrogen gas in the hemorrhoid during the treatment.

4.—Rectal speculums, medium and large sizes.

5.—One pair of rubber-covered cords.

6.—Light for illumination.

7.—Tuberculin syringe with extension arm and lock, to prevent needle from being pushed off while inserting the plunger (Fig. 6).

8.—Antiseptic solution and cotton applicators.

9.—A jar of sterile vaseline.

10.—Rubber examining gloves.

11.—Record cards.

12.—Table for examination and treatment.

Technic

1.—Preparation of the patient: As previously stated, it is necessary to have the lower colon completely empty, so that the operator may see the hemorrhoids clearly and so that there will be less danger of contamination and infection following treatment.

2.—The patient lies on the table, left side down and thighs flexed on the abdomen at practically right angles. This position is comfortable and makes it possible for the operator to obtain a good view of the rectum.

3.—The pad, well moistened with water, is placed well under the buttock, so that there will be firm contact on the entire pad.

4.—Insert the speculum slowly.

5.—Withdraw the obturator and have the generator running at zero.

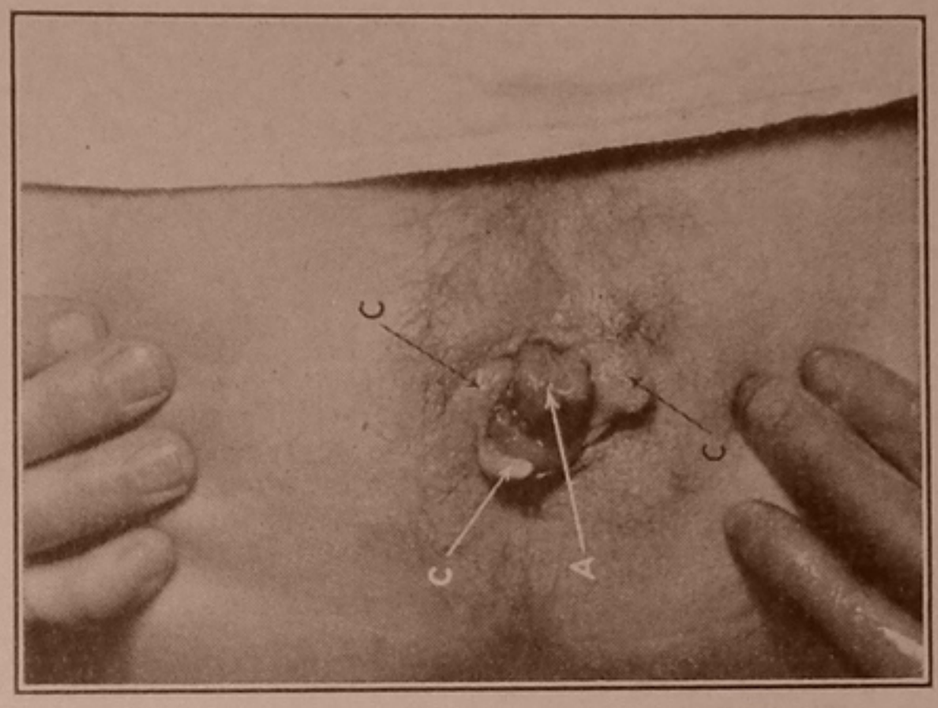


Fig. 4.—Shows (A) a large, protruding, internal hemorrhoid of forty years' duration, which had to be replaced two or three times daily for 10 to 12 months previous to treatment; (C) External tags.

6.—Locate the hemorrhoid to be treated, cleansing it with a small amount of antiseptic solution on a cotton applicator. Insert the needle just internal to the papillary line; as this location has few sensory nerves, it should not be painful to the patient.

The needle should be inserted superficially, 1/16 of an inch beneath the mucous membrane, with the point of the needle in the same plane as the speculum. Hold the needle firmly, with its hilt pressing against the mucous membrane, in order to hold all the hydrogen gas in the hemorrhoid during treatment. The needle point must not perforate the opposite side of point of entrance, for if it does so the hydrogen will escape.

After inserting the needle, and with the generator running, advance the current slowly; in one minute it should reach 12 to 15 milliamperes. If the current is not advanced slowly and turned back slowly, especially while turning back the last three or four milliamperes, it will produce discomfort to the patient. Do not allow the needle to touch the speculum during the treatment. If a slight burning or sticking sensation is present, shift the direction of the needle, and if it still continues, reduce the current one or two milliamperes. If pain is still present, turn the current back to zero slowly and discontinue

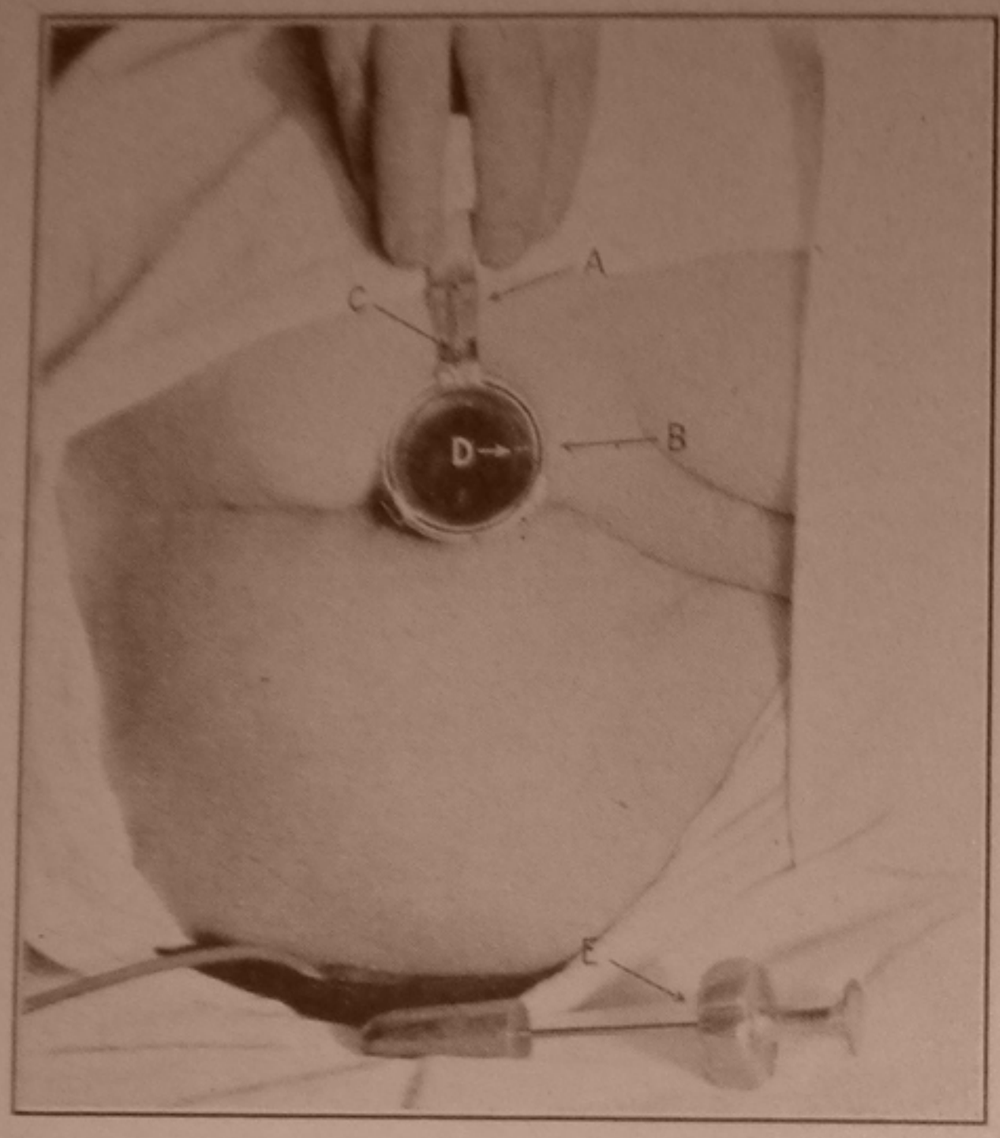


Fig. 5.—Author's speculum inserted and being held comfortably by the patient, who is lying on a moist pad electrode. This permits the operator to hold the needle-holder carefully with one hand throughout the treatment, while his other hand is free to regulate the machine.

(A) The handle rotates around the outer rim of the speculum; (B) four notches are made in this rim, permitting (C), a sliding lock, to hold the handle in these four positions; a pin (D) is placed inside the rim on the same side of the speculum as the slot. Thus, while the obturator is in place, the operator is able to determine the position of the slot. (E) Shows the groove in the obturator.

treatment, for there must have been some error in inserting the needle.

After the needle has been inserted properly, and there is no pain or discomfort to the patient, advance the current slowly and continue the treatment for from five to ten minutes, when a color change will take place in the hemorrhoid. At first a light-colored bubble of hydrogen will appear around the hilt of the needle, after which the hemorrhoid will turn dark-blue. The treatment is terminated at this point by slowly turning the current back to zero, and the needle is withdrawn. If the hemorrhoid is large, another treatment may be given without withdrawing the speculum.

Before treating very nervous patients, introduce the gloved finger, covered with Nupercaine ointment 1 percent, into the rectum, dilating the internal and external sphincter. If, after the speculum is inserted, the patient still has some pain, I inject the hemorrhoid with 0.5 cc. of 1 percent Novocain solution, using a tuberculin syringe (Fig. 6), which has a special extension arm with lock. This holds the small needle firmly, preventing it from being pushed off into the rectum.

The hypodermic needle should be inserted with the beveled edge toward the mucous membrane and just beneath it. Novocain so injected will produce a whitish swelling around the point of injection. No bleeding will follow the withdrawal of the needle, unless it has been inserted too deeply, in which case there will be little anesthesia and considerable bleeding upon withdrawal of the needle. After injection of Novocain, the hemorrhoid needle is quickly inserted in the same opening to prevent any oozing of blood which may follow the injection. The injection will cause the hemorrhoid to become temporarily larger, but it shortens the time of treatment and is more effective, because of the increased amount of fluid in the hemorrhoid.

Protruding internal hemorrhoids are treated while protruding as often as possible. After straining them out at toilet, the patient lies

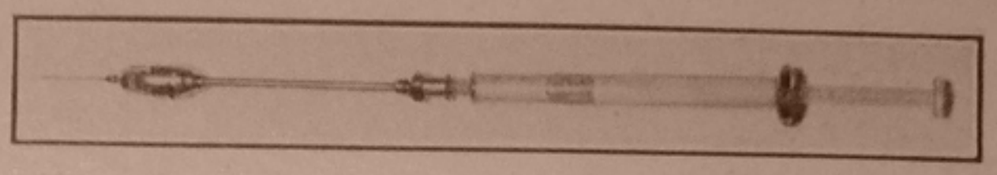


Fig. 6.—Shows a 1 cc. tuberculin syringe with 25-gage needle inserted in a three-inch extension arm with a lock to prevent the needle from being forced off during injection of Novocain solution.

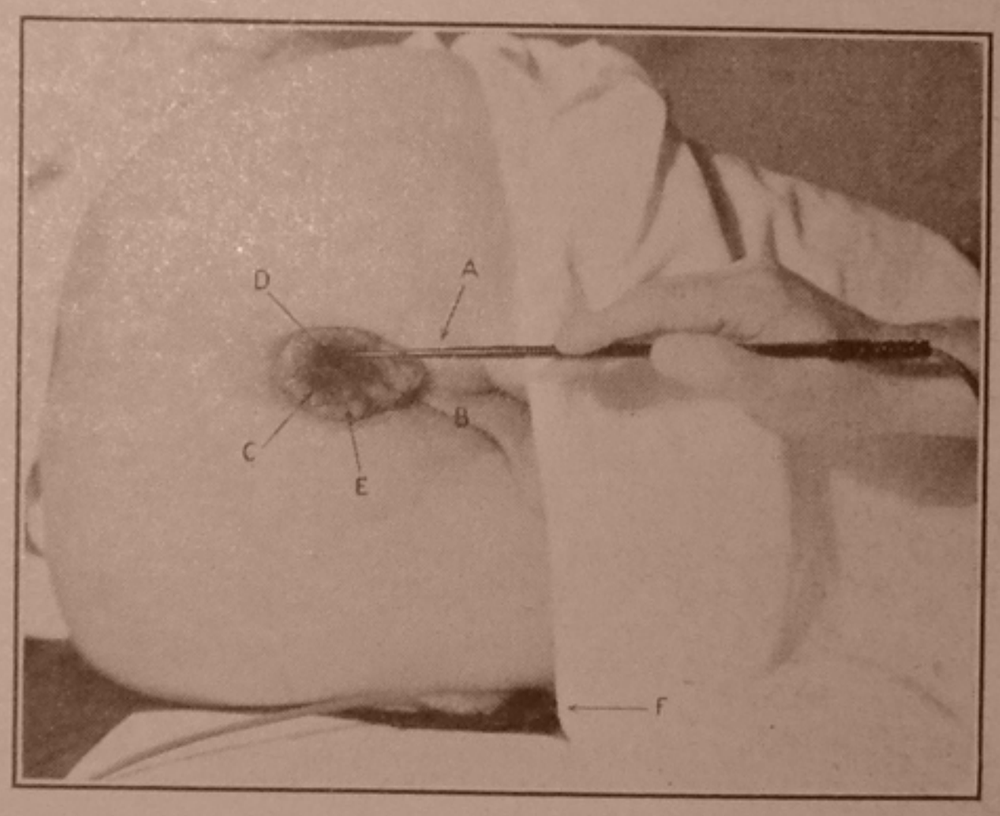


Fig. 7.—(A) Needle holder being held by operator with needle in position; (B) Anterior hemorrhoids; (C) Hemorrhoids on left side; (D) Hemorrhoids on right side; (E) External rim; (F) Indifferent electrode under patient. B, C and D show the color reaction which takes place immediately following treatment.

on the table and the hemorrhoids are treated (Fig. 7).

External hemorrhoids cannot be treated by negative galvanism, on account of the extremely sensitive nerve supply, which would make the treatment very painful.

Following treatment, the hemorrhoids are reinserted into the rectum by gentle but firm pressure by the gloved fingers of the operator, while the patient is still lying on the table. Instructions are given to the patient to keep the hemorrhoids within the external sphincter.

During previous years of my surgical practice, I removed hemorrhoids by the clamp and cautery, by excision and suture, and by the electric cautery. However, in 1930, when I first began treating hemorrhoids by nega-

tive galvanism, I found it to be far superior to the older methods. I have had over 300 patients suffering from hemorrhoids since that time, and have treated them with negative galvanism. To my knowledge none of these patients has had bad results nor recurrence.

It is remarkable that the cure of internal hemorrhoids frequently causes the disappearance of constipation, backache, shoulder pains, abdominal pains, nervousness and worry.

Postoperative Treatment

The patient is instructed to have no bowel movements for several hours after treatment. Patients have had bowel movements within a few hours after treatment with no bad results, but the straining at defecation, the extra congestion and trauma of the mucous membrane of the rectum and hemorrhoidal tissue may produce bleeding, pain, possible infection, and other conditions which would be detrimental in the healing and repair of treated tissue. Though the field is sterile during treatment, if the needle point is inserted too deeply compared to the point of entrance, infection is possible from the colon bacilli which are always present in the colon. Careful attention to the fine points is necessary for success.

For patients who have well-formed stools or are constipated, I recommend mineral oil once or twice daily, so that stool may be easily passed. Evacuation at regular hours is necessary. I advise an average of three to four days between treatments; and the number of treatments required varies from 7 to 10.

For patients who suffer from much pain and distress, I prescribe Nupercaine ointment, to be applied to the rectum after each defecation. Hemorrhoids which come out while the patient is at work or at stool should be reinserted immediately. If possible, the patient should lie down for a few minutes following reinsertion, so that the mass will not again be expelled.

A comparison of the negative galvanism and injection methods may be summed up as follows:

Negative Galvanism Method

1.—No recurrence of hemorrhoids reported.
2.—Very little discomfort.
3.—No abscesses reported.
4.—No scar tissue.
5.—Normal mucous membrane.
6.—No infections reported.

Injection Method

1.—Hemorrhoids many times return.
2.—Much discomfort.
3.—Abscesses have been reported.
4.—Produces scar tissue.
5.—Mucous membrane becomes scarred and hard.
6.—Infections have been reported.

In comparison with surgical removal, the galvanism method offers the following advantages, it being understood that, with the former method, opposite or contrary conditions exist.

1.—Negative galvanism does not require hospitalization.
2.—Negative galvanism requires no loss of time from work.
3.—Negative galvanism is not painful.
4.—Negative galvanism does not ordinarily require anesthesia.
5.—Negative galvanism is not followed by hemorrhage.
6.—Negative galvanism is not followed by excessive scar tissue and, therefore, does not produce partial or complete stricture.
7.—Negative galvanism is not followed by paralysis of the sphincter and incontinence.
8.—Recurrence is less likely after negative galvanism.
9.—Not one death reported following negative galvanism.

Case Reports

Case No. 1: Mr. W. R. M.; Age, 35; Salesman.

Symptoms: Bleeding, protruding hemorrhoids for the past 15 years. Pain, bleeding and protrusion at each defecation. Hemorrhoids easily reduced, but protruded again shortly after being reinserted. Patient was first seen in 1930 and was unable to work on account of pain and discomfort. Only temporary improvement resulted from injection treatment.

Examination: Three large internal hemorrhoids, dark-blue in color, each hemorrhoid being ¾ inch in diameter and covered by mucous membrane. Rim was distended and hemorrhoids protruded easily.

Diagnosis: Three large, bleeding, internal, protruding hemorrhoids.

Treatment: Ten negative galvanism treatments given at weekly intervals.

Results: Bleeding ceased and hemorrhoids did not again protrude after the second treatment. Complete relief from pain and discomfort. Further examinations in 1932 and 1934 revealed no sign of hemorrhoids and no cicatricial tissue.

Case No. 2: Mr. A. J. D.; Age, 68; Salesman.

Symptoms: Patient came in on February 26, 1934, stating that for the past 40 years he has been troubled with painful, bleeding, protruding internal hemorrhoids. During the last 6 years, the hemorrhoids protrude three to four times daily. Replacing hemorrhoids requires several minutes' time and is accompanied by much pain. Bleeding at every defecation. Protrusion many times occurs while patient is walking about. The condition has caused him to become extremely nervous.

Examination: Large tags on right and left sides. Four large, protruding, internal hemorrhoids, each one entirely filling the speculum in right, left, anterior and posterior sides. Hemorrhoids protruded outside of the external sphincter on slight straining while patient lay

on table. Patient had severe pain and much bleeding while hemorrhoids protruded.

Diagnosis: Four second-degree, bleeding, protruding internal hemorrhoids.

Treatment: Eleven negative galvanism treatments were given at three-day intervals during February and March, 1934.

Results: The patient was completely relieved of bleeding, pain and protrusion after the fourth treatment. Examination in March, 1935, revealed complete absence of internal hemorrhoids, and there was no cicatricial tissue.

Case No. 3: Mrs. C. O. R.; Age, 51; Housewife.

Symptoms: The patient came in complaining of internal hemorrhoids, accompanied by pain and distress during defecation. She had been constipated for twenty years and took a laxative every night.

Examination: Two large hemorrhoids entirely filling the speculum on left side. Hemorrhoid half filling the speculum on the posterior side. Two large hemorrhoids on right side entirely filling the speculum. Anterior hemorrhoids entirely filled the speculum.

Diagnosis: Six large, painful, internal hemorrhoids.

Treatment: Eight negative galvanic treatments were given during October and November, 1932.

Results: The patient had no pain or distress after the second treatment, and after treatments were completed she had normal defecation every day for the first time in twenty years. Further examinations in 1933 and 1934 revealed no sign of hemorrhoids and she continued to have normal, daily evacuations.

Summary and Conclusions

1.—Negative galvanism, properly performed, gives the best known treatment for internal hemorrhoids.

2.—It is possible for all sufferers from internal hemorrhoids to be cured by this method. It is painless, does not require hospitalization and the patient is able to carry on with his work.

3.—The hemorrhoid needle must be held steady throughout treatment.

4.—The generator must be turned on and off very slowly.

5.—After two or three treatments, many patients state that they feel 75 percent better than before treatments were started.

6.—The technic has been perfected to such extent that now many cases are cured which formerly would have required extensive operations, with hospitalization for weeks.

7.—I recommend negative galvanism because of the probability of complete cure, with practically no discomfort.

8.—I stress the importance of a thorough examination of the patient before treatment is begun.

9.—A thorough examination of the patient is usually *not* followed by a treatment at the time of his first visit. The first treatment can be given a day or two later.

10.—Explain to the patient, carefully and in detail, the procedure and how little discomfort he will experience.

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OBLITERATION OF HEMORRHOIDS WITH NEGATIVE GALVANISM *

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Hemorrhoids being affections most frequently seen by general practitioners, a method of treatment which in selected cases is simple, free from risks, and ideally curative, merits earnest consideration. It is generally conceded that surgical removal of any kind has not been satisfactory in many instances, to say nothing of the need of anesthesia, hospitalization, after care, and the like.[1] It is partly due to these undesired methods of treatment and partly to the failure of the medical profession to avail themselves of simpler and less disabling methods that patients have been driven to seek so-called bloodless cures by irregular practitioners.

Unfortunately the medical curricula have adhered to the purely surgical aspect of therapy and have ignored certain advances which are not lacking in scientific rationale. Drueck[2] states that occasionally even well executed surgical procedures have resulted in such complications as hepatic abscess, rectal stricture, infections, and recurrences due to jeopardizing systemic conditions. There are, of course, certain forms of hemorrhoids for which surgery of some sort is absolutely indicated. But in the majority of instances I have found a method which is simple and yet highly effective. The patient's inalienable right to choose a less radical procedure is sufficient reason for inviting attention to the proper use of the negative galvanic current as an ideal method for obliteration of certain forms of hemorrhoids.

Rationale of the Negative Galvanic Method

Contrary to common belief, this method is not new,[3] it being first employed in 1867. Nothing worthy of note was heard of it until 1892, when Baker presented a "Treatment of Hemorrhoids by Electricity." Baker's work inspired its adoption in certain localities, but many failures due to defective technic and unfamiliarity of its chemical action mitigated against it. In the past decade successful technic has been developed. Chemical changes which take place in the tissues are now better understood. Although the exact colloidal reactions are yet to be discovered, research work leads me to believe that we are at the threshold of a thorough appreciation of the microchemical and physiological actions involved in the treatment. Sufficient experience has been gained to justify the classification of the obliteration of hemorrhoids by negative galvanism as a scientific method of treatment in the nature of a chemical reaction.

Haynes[4] reports that in 1866, Althaus made microscopical observations of the changes in animal structures due to the electrolytic action of the negative galvanic needle. He found that the tissues were markedly contracted, and that there was neither inflammation, suppuration, nor sloughing. When the current was applied to the blood vessels they became changed into solid strings due to disintegration of the blood and deposition of lamellated fibrin. He concluded that no animal tissue can withstand the disintegrating effect of the negative pole; that the force and rapidity with which disintegration is brought about are directly proportional to the strength of current and to the softness and vascularity of the structures; and that the current could be safely and successfully applied to contract and disintegrate tissue, and obliterate blood vessels for surgical purposes. When applied to hemorrhoids, the negative pole produces first a hydrolytic decomposition and then a contraction of the tissues. Webb[5] states that electrolytic destruction of the vasa vasorum is highly significant. Actual obliteration of the thrombosed mass is accomplished in one of two ways: It either absorbs as occurs in any simple contusion; or, if a large, thin walled hemorrhoid is treated, it ruptures, causing a discharge of the thrombosed elements into the rectum. Following this there is contraction of the underlying tissue with hemostasis, absence of pain, and rapid healing of the parts.

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* Read at the Thirteenth Annual Session of the American Congress of Physical Therapy, Philadelphia, September 11, 1924.

* From the Physical Therapy Department, Cook County Hospital, Chicago.

Advantages of the Negative Galvanic Method

The advantages of this method are its simplicity, safety, and apparent permanency of cure. It is a procedure requiring neither anesthesia nor hospitalization. There are no unfavorable sequelae. In my own work I have never seen a severe complication in over 700 individual treatments. Actual hemorrhage has never been encountered, although patients commonly report the loss of a few drops of blood at stool following each galvanic application. To date there have been no cases of rectal stricture or metastatic abscess. Webb's experience with electrolysis justified his belief that there is no danger from embolism. The treatment presupposes special but simple technic.

Permanency of cure is due to complete obliteration of the entire vein from its point of origin to its most dependent portion. In surgical hemorrhoidectomy the actual site of origin of the hemorrhoid in the superior hemorrhoidal plexus is frequently too high to permit of surgical removal without an extensive operation with sacrifice of much normal tissue. If the terminal or dependent portion of the mass only is removed, the remaining segment near the plexus may easily become enlarged under pressure and cause recurrence.

Hemorrhoids may be classified as external, internal, and mixed or internoexternal. External hemorrhoids may be subclassified as thrombotic, skin tabs, and varicosities. Internal hemorrhoids are subclassified as varicose, and capillary or nevoid piles. Internal varicose hemorrhoids are again subclassified into non-protruding and protruding. Mixed hemorrhoids possess the characteristics of both internal and external hemorrhoids.

As all forms of external hemorrhoids are covered with integument and richly endowed with sensory nerves, the negative galvanic current or any other method except surgery is not applicable. Their clinical significance does not usually necessitate special medical attention.

Internal and mixed hemorrhoids in one form or other make up 90 per cent of cases coming to treatment, because they are the most important clinically. It is in these types that negative galvanism is highly effective. True internal hemorrhoidal tissue being practically devoid of sensory nerves, obliteration of these tumors with negative galvanism is a painless procedure.

Equipment

The principal appliances needed for this type of operation are:

1. A galvanic generator producing a perfectly smooth current.
2. A large, dispersive, indifferent electrode, 4x8 inches in size.
3. Large, medium, and small sized Brinkerhoff speculae.
4. A convenient operating table.
5. Specially constructed rectal needle electrodes with short, medium, and long tips.

The *active needle electrode* is a most important factor, because it must deliver the current to the interior of the hemorrhoid while preventing escape of hydrogen from the tissue, and allow clear visibility of the operative field. I devised in 1932, a set of electrodes so constructed as to prevent past defects in instrumentation. This set consists of a hard rubber handle with a six-foot cord, and three extra long, insulated, steel needles, with points one-eighth, one-fourth, and five-sixteenths inches in length. The insulated portion of each needle shaft is seven and three-fourths inches in length and only one-eighth inch in diameter, which permits ease of manipulation and affords clear vision of the operative field. As the exposure with a Brinkerhoff speculum is none too large, a needle shaft of the above dimensions is essential for unobstructed manipulation. The insulated portion is of hard rubber and is tapered at the base of the needle in a manner to prevent escape of hydrogen gas. A chuck in the needle handle steadies the needle securely, assuring perfect conductivity of the current.

The average case needs no other preoperative measure than evacuation of the bowels and a preparatory cleansing enema. A large, prolapsed, irreducible hemorrhoid may necessitate a preliminary divulsion of the sphincter. In cases of mixed hemorrhoids with external thrombi, the clots should first be emptied. It hardly needs mention that any etiologic factors responsible for the development of hemorrhoids should receive proper attention.

Technic for Internal Non-Protruding Hemorrhoids

The patient is placed on the table on his left side in Sims' position. The dispersive electrode, having been thoroughly moistened, is connected to the positive pole and placed un-

der the patient's left thigh. The needle in the insulated handle is connected to the negative pole. The speculum is gently inserted to its full length, well above Hilton's line, and the slide withdrawn until the uppermost hemorrhoid comes into view. Slight rotation of the speculum while the patient strains will expose the entire hemorrhoid. The needle electrode is now inserted into the tumor. As before stated, true hemorrhoidal tissue has no sensory nerves, which fact enables the painless insertion of the needle. Genuine hemorrhoid tissue is most often characterized by the brilliant red color of the submucous tissue appearing through a break or erosion in the mucous membrane, but if the mucous membrane is intact the tumor will have a dark violacious appearance. The needle should be inserted wherever the bright red submucous tissue is observed. Normal mucous membrane is characterized by its pale, pink, translucent appearance and should never be touched with the electrode. The needle is inserted in the uppermost portion of the hemorrhoid, in the longitudinal axis of the vein, and at a very slight angle to the rectal canal. Insertion should be made firmly into the mass to prevent leakage of hydrogen, without, however, touching the opposite wall in order to avoid pain and possible sloughing of the muscularis or mucosa.

From the standpoint of pain and end results a successful treatment demands that the needle point be in the lumen of the vein. The patient is our best guide, for if he complains of burning pain the technic is improper. Anesthesia should be avoided in all cases, because it deprives us of this index. The current is now turned on very gradually, two to three minutes being required to bring the current up to 10 or 15 milliamperes, according to the tolerance of the patient. If in the opinion of the operator proper insertion has been made and there is burning pain, the needle point should be shifted to another angle while in the tissue. Should pain persist following such a manipulation, the current should be shut off and the needle reinserted into a new place. It should always be inserted before the current is turned on, and upon termination of treatment the current should always be slowly turned off before the electrode is withdrawn. A violation of these rules will produce a sudden shock, which, of course, should be avoided. The maximum current tolerance is continued until a change of color occurs in the tissue. At first, light colored bubbles are seen under the mucosa which later changes into a dark red, and in some instances nearly black, color. Treatment is terminated at this point, the whole procedure lasting 10 to 12 minutes. The current is slowly turned off and the needle withdrawn.

If the tumor is large, one or two other insertions are made one-fourth to one-half inches away from the first and the process is repeated. However, in all punctures subsequent to the first, the current is continued for only five minutes, because discoloration appears much sooner. The evidence of successful treatment is complete discoloration of the entire hemorrhoidal mass, the number of insertions required for each tumor depending on its size. Not more than one hemorrhoid is treated at a seance to avoid nervousness or fatigue of the patient. Treatments are given every third day, the average case requiring about six treatments for complete obliteration of all hemorrhoids.

Transitory nervousness and excitement may be controlled by general conversation during treatment. Complaint of burning pain is significant, but other sensations are due to pressure and require no attention.

Technic for Internal Protruding Hemorrhoids

Internal protruding hemorrhoids are treated while prolapsed, wherever possible, without the aid of a speculum. If the hemorrhoid cannot be reduced, a divulsion of the sphincter should first be attempted. Easily reduced hemorrhoids often do not protrude at a seance and should be forced out. For this purpose an enema may be given and the patient instructed to strain while evacuating. If this fails, the speculum should be inserted, the slide withdrawn, and the hemorrhoid crowded into the groove. The speculum is then withdrawn and the mass everted. Only the one hemorrhoid selected for treatment is everted and all others are replaced within the rectum to insure comfort. In this type of hemorrhoid a shorter needle in a 3-inch applicator is employed. The method of insertion, time of treatment, and current intensity are the same as in the preceding technic.

At termination of treatment the discolored mass is replaced within the rectum, no patient being allowed to leave the office without replacement of all protruding masses. Except

for a peculiar feeling of fullness for about twelve hours following treatment, there is no painful reaction. If a thorough treatment has been given the individual tumor will retract well within the rectum and carry the loose, redundant folds of perianal integument with it. This dramatic result never fails to impress the patient who has suffered with protruding hemorrhoids for a long period. After all protruding hemorrhoids have been obliterated, completion of treatment is exactly the same as that for internal, non-protruding hemorrhoids. The speculum is inserted and the remaining hemorrhoids treated at their origin, as high in the rectum as possible at first, and at lower levels later.

Capillary hemorrhoids are rare and clinically unimportant as compared with internal venous hemorrhoids. Being situated in the rectal ampulla, they do not protrude and are diagnosed by speculum examination. Due to their histologic structure the sentinel symptom is bleeding. Although they frequently heal spontaneously, they are effectively treated where indicated by insertion of the negative galvanic needle directly into the mass, with the same technic as for internal non-protruding hemorrhoids, but with a lessened current intensity and time.

Mixed Hemorrhoids can usually be successfully obliterated by applying the negative galvanic current to the mucous portion and treating through the speculum with the technic given for internal, non-protruding hemorrhoids. However, I wish to emphasize that the negative galvanic needle can never be applied to any hemorrhoid clothed with integument and therefore the external portion of a mixed hemorrhoid cannot be so treated. But in most cases, if the internal portion of the mass is obliterated, sufficient contraction takes place to cause a definite retraction of the external portion within the rectum where it undergoes contraction and obliteration.

Postoperative Treatment

Following each treatment, a small quantity of nupercaine ointment, 1 per cent, is injected into the rectum. No other postoperative treatment is necessary, as the after effects are negligible. Bleeding, pain, and protrusion usually cease after the first treatment; all symptoms are promptly relieved. The hemorrhoid undergoes a rapid change, the mucosa assuming a normal condition in one week to ten days. If the hemorrhoid is then not completely obliterated, insufficient current has been used. In such a case a second treatment of shorter duration should be given. At no time does the patient have to be recumbent.

Progress and termination of a case is determined by the speculum. Tumors readily force their way through the window at beginning of treatment, but when terminated the slide may be withdrawn to the papillary line and the instrument rotated in a complete circle without the usual bulging appearing in the window.

Existing complications are best treated preoperatively. Fissures, ulcers, perirectal abscesses, or fistulae should be eradicated first. A markedly contracted sphincter is divulsed before any treatment is given, because it will benefit small internal hemorrhoids and hasten the actual obliteration of the treated tumors. Proctitis and colitis commonly associated with hemorrhoids should not be treated first if they are a secondary manifestation.

Comparison With Operative Methods

The following comparative advantages of negative galvanism are enumerated:

1. Negative galvanic treatment never causes more than a well tolerated discomfort to the patient. Postoperative defecation is not painful. Surgical removal produces postoperative pain, usually severe enough to demand narcotics. Bowel movements during the seven-day postoperative period often cause severe pain.

2. Anesthesia is not required with negative galvanism, in contrast with surgery.

3. Hemorrhage following negative galvanism never occurs, while surgical removal, as emphasized by Drueck[6], not infrequently is followed by extensive postoperative hemorrhage, requiring heroic measures for control.

4. Infection following negative galvanism, if ever, takes place[3]. The method itself is self-sterilizing. I have never seen an infection in a large number of cases treated both in private practice and at Cook County Hospital, Chicago. Infection following surgery is always possible and may become serious due to the venous relationship of the rectum to the portal system.

5. Sequelae and complications following negative galvanism have not been observed. Surgical removal frequently causes vesicospasm with retention of urine, stricture of the rectum with anal stenosis, fistulae, fissure, abscess, and incontinence of feces.

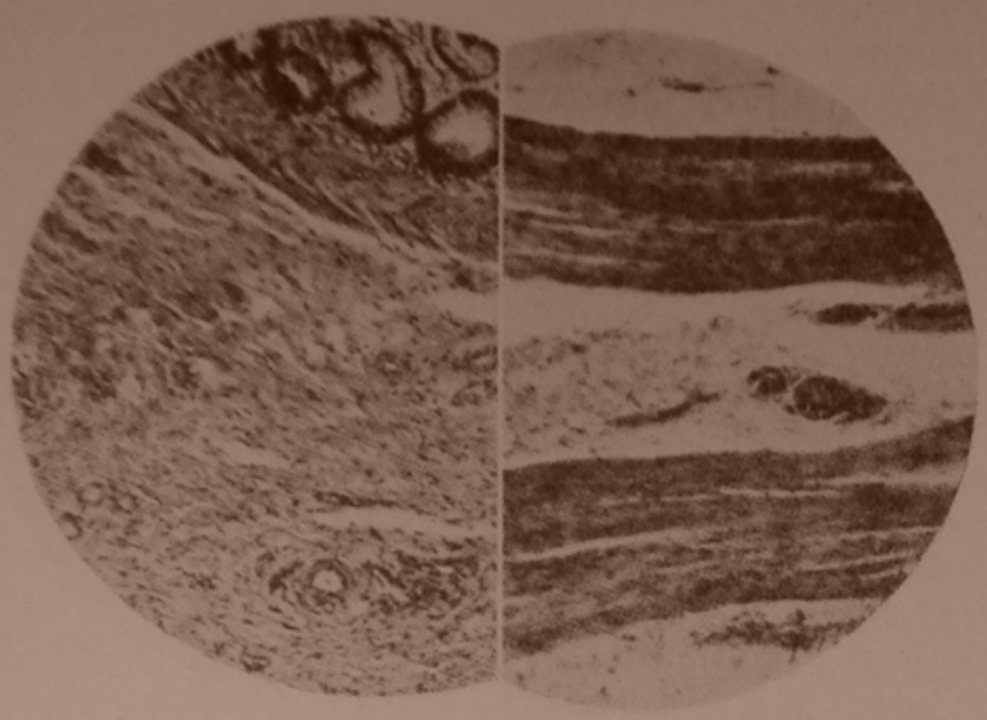


Fig. 1. Microphotograph (high magnification) of rectal tissue of dog taken 12 hours after treatment with negative galvanism at 15 ma. for 10 minutes. Note integrity of muscle fibers with complete destruction of connective tissue and vascular elements. Observe contrast with normal tissue section shown at left.

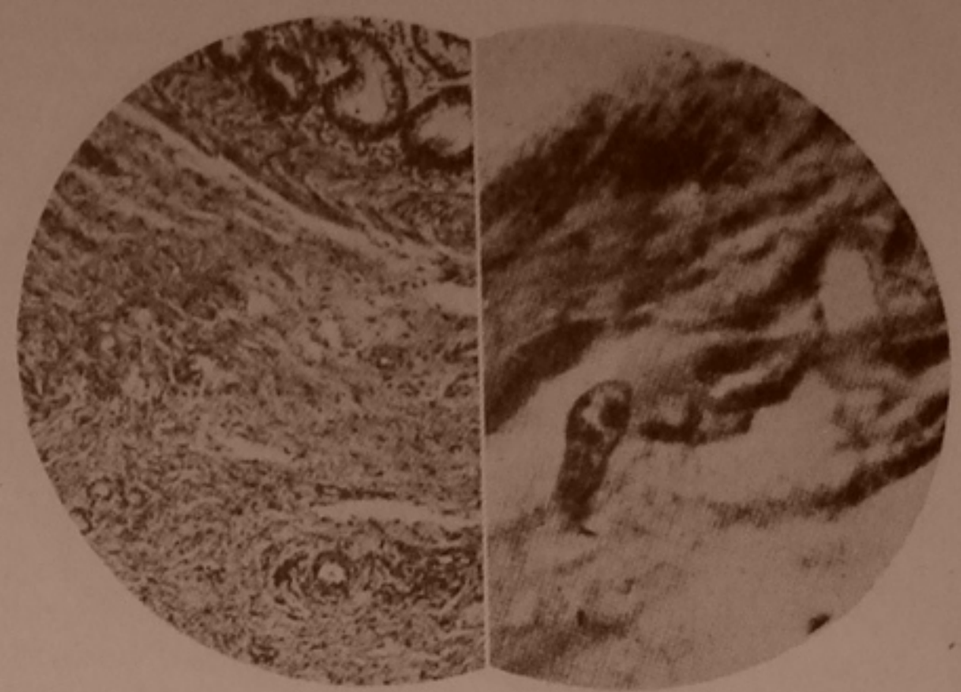


Fig. 2. Microphotograph (medium magnification) of rectal tissue of dog 12 hours after treatment with negative galvanism at 15 ma. for 10 minutes. Complete tissue disintegration is evidenced by absence of nuclei. Note thickening of thrombosed capillary wall and also of the intramuscular glands. The surface membrane presents a smooth appearance. Observe normal tissue section at left.

6. Mortality following negative galvanism has never been reported, while surgical fatalities from primary hemorrhage, fulminating infections, and bronchopneumonia, are matters of record.

7. Recurrence after negative galvanism must be very rare, not one having been observed in more than 100 cases. Webb[5] found electrolysis of hemorrhoids to be the most permanent method. Permanency of cure is due to treatment of hemorrhoids at their origin. Miller[7] states that a firm and normal physiological support for the venous plexus is formed by contraction and adhesion of the mucous membrane. Redundant mucosa becomes obliterated although normal mucous membrane retains its original elasticity and tonicity without scar tissue formation. With surgical methods, difficult accessibility to the hemorrhoidal origin in the plexus tends toward incomplete removal, and, even if the tumor is completely removed, there is usually a sacrifice of much normal tissue causing excessive scar formation and a potential stricture.

8. There is no loss of time to the patient with negative galvanism, it being an ambulant office procedure — a self-evident economic advantage. The same applies to avoidance of expense incident to hospitalization for surgery.

9. With negative galvanism there is no need for restriction of diet, before, during, or after treatment, usually required with surgical procedures.

Comparison With Electrosurgery

Electrocoagulation is an operative procedure because of its destructive principle and need for anesthesia[8]. It has never been widely in vogue. Ronneaux[9] states that when local anesthesia is employed there is danger of edema due to the action of the heat production on the excessive fluid of the tissues which causes undesirable postoperative pain and constant danger of hemorrhage. This procedure must be considered comparable to orthodox surgical removal with all its disadvantages. Although danger of metastatic abscess may be lessened as compared with classic surgery, this advantage is offset by the possibility of edema, painful postoperative reaction, sloughing, and hemorrhage. As compared with negative galvanism we must conclude therefore that electrocoagulation possesses most of the disadvantages of surgical hemorrhoidectomy.

Comparison With Injection Methods

The injection method presents such conflicting ideas regarding technic, solutions, dosage, and end results, that there is a lack of standardization. It therefore becomes difficult of comparison with either negative galvanism or operative methods. The rationale of the injection method is based on an inflammatory sclerosing reaction. Anderson[10] observed microscopically that all changes following injection of 10 per cent phenol represented an effort of the tissues to repair an injury. By virtue of this action there is contraction of normal tissue and scar formation. Although hemorrhoids may be obliterated, this is done at the expense of a contracted, and distorted mucous membrane, which has lost its elasticity, and presents a hardened "washboardy" ap-

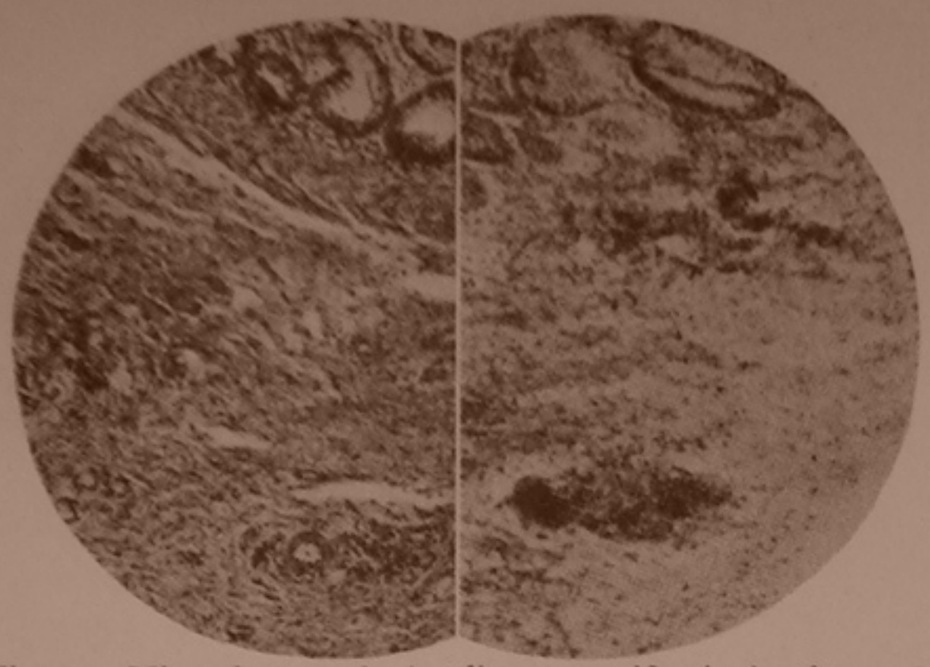


Fig. 3. Microphotograph (medium magnification) of rectal tissue of dog taken 12 hours after injection of ½ c. c. of 5 per cent phenolized cells. Observe normal tissue section at left.

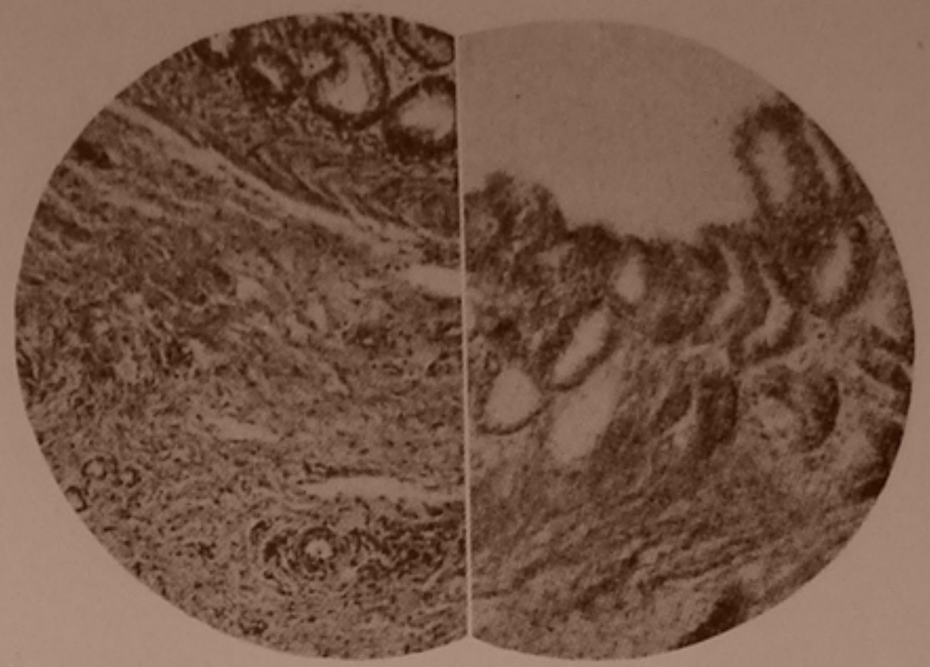


Fig. 4. Microphotograph (medium magnification) of rectal tissue of dog taken 12 hours after injection of ½ c. c. of 5 per cent phenolized oil. Note marked sclerosis of muscularis mucosa, contraction of Goblet cells and marked contraction of surface membrane. Observe normal tissue section shown at left.

pearance. If insufficient solution is injected to produce this sclerosing effect, hemorrhoids fail to total obliteration. If not completely obliterated, they will return as they do following incomplete surgical removal. Thus, recurrence is not unusual and I have frequently treated cases successfully with negative galvanism which had been injected one or more times futilely. The negative galvanic current does not produce such an inflammatory sclerosing effect because the chemical action is on the liquid content of the mass instead of the tumor wall, and its one great advantage over all other methods is the resultant normal resiliency of the mucous membrane after obliteration.

Sequelae and complications following injection treatment are of frequent record. Spencer[11] reported a fatality and presented sufficient necropsy findings to justify his statement that injection of sclerosing fluids markedly reduces tissue resistance. Hawkins[12] demonstrated the danger of infection and abscess formation from phenol injection and found that it frequently causes fistula. Kilbourne[13] in 1934, made an exhaustive international survey of cases treated with operative and injection methods. Reports were obtained from 293 proctologists. Out of 26,262 cases treated with the injection method the following unfavorable results were reported: Severe sloughing, 285; serious hemorrhage, 73; severe stricture, 6. At the termination of a three-year observation period there were 966 recurrences in 9,691 cases injected. These results hardly differ from those reported by Andrews[14] fifty years ago when the injection method was in its infancy. By comparison we find:

TABLE 1

Comparison of Past and Present Results of Hemorrhoid Injection

	ANDREWS	KILBOURNE
Severe sloughing	50 years ago, 1.06%	Today, 1.09%
Severe hemorrhage	50 years ago, .3%	Today, .27%
Anal stricture	50 years ago, .06%	Today, .02%
Recurrence	50 years ago, .5%	Today, 10.0%

That the ideal solution for hemorrhoid injection has not been found is attested by the fact that a well known proctologist who had used negative galvanism with highly successful results, is now attempting to produce hydrogen gas in the hemorrhoid by the injection of some chemical. It is obvious that he values the end results of negative galvanism above that of the injection method, but wishes to attain such results with the shorter technic of injection. In this endeavor I predict that he is doomed to failure, for I am certain that negative galvanism can never have a chemical substitute. Surely the splendid end results of negative galvanism will more than repay the operator for the few extra minutes of work. Dunne[15] believes that treatment of the future for many rectal conditions will be some form of electrotherapy.

Limitations of Negative Galvanism

That external hemorrhoids cannot be treated with galvanism has already been stated. The comparative length of time required for each application has been the subject of objectionable comment. Complaint also has been made that due to the required time and exactness of technic, the procedure was too tedious for the operator steadily to support the needle. Another difficulty experienced by operators was their inability to change the setting of the generator while one hand was con-

fined to holding the speculum and the other the needle, requiring, therefore, the services of an assistant. I have overcome both of these features by devising a simple accessory, the "Needle Guide-Holder." It consists of a small knife-blade joint at the end of a one-half inch shank. This shank is inserted into a small split stud, fastened to the speculum by drilling a hole in the lower handle. Above the knife-blade joint and attached to it is a small sleeve with a ball-tension joint the calibre of which is large enough to accommodate the needle. In the center of the sleeve is an automatic spring which exerts a constant pressure on the insulated portion of the needle and prevents its retraction following insertion. At the right is a small screw lever. When this is loose the needle is capable of motion in any direction, but when tightened it holds the needle securely in place. It is then only necessary to hold the handle of the speculum with one hand, allowing freedom for the other to manipulate the generator. This device is removable and may be attached to any standard size Brinkerhoff speculum to which the necessary stud has been fastened. I have found it of great advantage in eliminating all tediousness and fatigue.

Report of Cases

A brief report of six typical cases is presented as illustration of what may be accomplished:

CASE 1.—Mr. R. R., aged 40, railway mail clerk. Symptoms: Bleeding, protrusion, pain, constipation. Protrusion constantly present; reducible but appearing again almost immediately. Pain of sufficient severity to cause absence from duty. Has taken epsom salts every morning for past two years. Was advised operation imperative.

Examination: A large internal protruding hemorrhoid is seen externally, deep red in color and about the size of a hazel nut. It is covered with mucous membrane and is reducible. Speculum examination reveals large internal hemorrhoids on all walls. When slide is withdrawn to the papillary line, the tumors protrude into the groove of the instrument at any point at which it is placed.

Diagnosis: Severe internal protruding hemorrhoids. Treatment: Eight applications of negative galvanism were given at three-day intervals.

Results: Bleeding stopped entirely after the first and protrusion ceased after the second treatment. Postoperative observation at three, six, and twelve months showed the hemorrhoids to have entirely disappeared as have all the subjective symptoms.

CASE 2.—Mrs. M. H., aged 48, housewife. Symptoms: Constipation, backache, rectal pain, and occasional slight bleeding. Backache of three years duration. Has not been relieved by previous treatments.

Examination: Large internal hemorrhoids observed through the speculum. Externally no protrusion but a suggestion of bulging in perianal skin opposite both lateral walls.

Diagnosis: Internal non-protruding hemorrhoids.

Treatment: Six applications of negative galvanism at four-day intervals. Mineral oil nightly.

Results: Backache and rectal pain markedly relieved after the first treatment which gradually improved and disappeared after the fourth application. Bowel movements regular after the fifth treatment.

Comment: This case had been treated twice previously during a five-year period with the injection method. No recurrence either for the tumors or symptoms 22 months after completion of course.

CASE 3.—Mr. H. G., aged 53, newspaper editor. Symptoms: Slight bleeding after defecation. Occasional dull pain. Severe itching almost constant.

Examination: External, negative. Internally, moderately sized hemorrhoids.

Diagnosis: Pruritus ani, secondary to internal, non-protruding hemorrhoids.

Treatment: Six negative galvanic applications.

Results: Bleeding and pain ceased entirely after the second treatment. Itching improved after the first and disappeared after the third treatment.

Comment: This case had been operated twice and treated once with diathermy during a seven-year period, with incomplete relief.

CASE 4.—Mrs. N. E., aged 34, housewife. Symptoms: Constant pain, worse after defecation. Multiple peri-rectal abscesses for the past 3 years. Constant rectal discharge and occasional bleeding.

Examination: Connective tissue piles externally. No protrusion. Bilateral fistula-in-ano. Probe inserted to the depth of about one inch, but no internal opening was found. Multiple internal hemorrhoids visible through the speculum.

Diagnosis: Fistula-in-ano, internal, non-protruding hemorrhoids.

Treatment: Under general anesthesia, division of the sphincter and dissection of the fistulous tracts. This was followed in one month by four negative galvanic applications.

Result: Cure.

CASE 5.—Mr. R. J., aged 72, watchman. Symptoms: Protrusion with slight beeding. Condition present for past 12 years, but bleeding has become less severe during past three years.

Examination: Large internal protruding hemorrhoids continuous with external varicose hemorrhoids.

Diagnosis: Mixed hemorrhoids, severe.

Treatment: Seven negative galvanic applications at four-day intervals.

Result: Protrusion of mucous portion disap-

peared after second treatment. External varicose portion markedly contracted after the fifth and disappeared after the seventh treatment. No bleeding after the second treatment.

Conclusions *

1. Treatment of hemorrhoids by negative galvanism offers a large field for qualified general practitioners. Ninety per cent of all hemorrhoids are amenable to such treatment.

2. Although surgical treatment is the only method for external hemorrhoids, all cases of internal and most cases of mixed hemorrhoids can be permanently and safely obliterated with negative galvanism, without loss of time and without painful reaction.

3. Negative galvanism is an effective and painless method of obliteration, the technic of which is comparatively simple. Many patients today demand ambulant treatment which should be accorded by ethical physicians.

5. The negative galvanic treatment of hemorrhoids is not new, but its technic has been greatly developed on a scientific basis.

6. The superiority of negative galvanism for internal and mixed hemorrhoids is based on simplicity of technic, safety of procedure, and permanency of cure.

7. Equipment embraces a generator which provides a smooth galvanic current and needle electrodes capable of flexible manipulation. A needle guide-holder saves labor and eliminates the need of assistance.

8. No special preoperative or postoperative treatment is required for this procedure.

9. Comparison of negative galvanism with other methods of treatment proves it the method of choice because of physiological end results and absence of serious complications.

10. Advantages of negative galvanism far outweigh its minor inconveniences, chief of which is the time involved for each of a series of successful applications.

6205 Broadway.

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* The author acknowledges his deep indebtedness to Dr. Disraeli Kobak for his advice, interest and help in supervision of this study.

Reprinted from
Archives of Physical Therapy, X-Ray, Radium
September, 1934

Printed in U.S.A.

OPERATING INSTRUCTIONS FOR THE FISCHER MODEL "J" UNIVERSAL LOW VOLTAGE GENERATOR

For The

Production of Continuous or Surging Alternating or

Direct Currents

- - - - -

A highly perfected mechanical electrical device, the embodiment of several years' research and experimental work to produce an apparatus combining in one compact unit all the usable low voltage currents; a true straight line galvanic; surging galvanic. An entirely new method of generating these modalities enabling the applications of more voltage and milliamperage with less discomfort to the patient than with any other known means.

The galvanic current is remarkably smooth and comparable to that from a battery source; absolutely without fluctuations. The sine waves are produced with positive repetition, at any speed, current volume or nature of surge.

The construction is at once simple, compact and durable; there are less moving parts, with correspondingly less danger of possible troubles.

In operation this machine is also quite simple; you change from one type of current to another quickly, by merely turning a knob; nothing to remove, nothing to add. Less moving parts, and extra heavy construction wherevor necessary guarantees an almost endless life to the entire apparatus. This unit is practically noiseless in operation and capable of delivering all currents from zero potential to more volume than is ever required therapeutically.

The available currents are clearly indicated by diagrams.

- - - - -

The dwell periods are produced by a more rapid rise and fall of voltage during the surge, the time so gained being used in maintaining the highest or

peak voltage of the particular setting for a longer period. The contraction of the muscle is maintained for a period of 1/3 the impulse instead of immediately dropping from the peak point. Rest periods are for relaxation of muscles to avoid fatigue.

Special filtering devices are employed in this unit for the purpose of smoothing out any possible unevenness in the discharge.

The surges, or waves, may be timed from 6 to 42 per minute, and may be altered at will without stopping the equipment, turning off the current or disconnecting the patient; another distinct innovation and far simpler than the cam action on other similar apparatus.

A very valuable feature is the type of patent flat terminal connector furnished for use with the flexible pad electrodes. This connector is perfectly flat, the cord may be rotated completely around without becoming disconnected, and positive contact is assured. Additional cords with regular tip connectors, are furnished for use with the metal electrodes.

The current outlets are very distinctive in character. They embody an idea not heretofore attempted in electrotherapy equipment construction, and the cord connectors cannot possibly fall out. The cords may be pulled from any angle but will not become disconnected, excepting that the tip itself be grasped in the fingers and pulled straight upward. Physicians who have suffered the inconvenience of having cords come loose while applying electric currents to their patients will thoroughly appreciate this innovation. Between these terminals is mounted a polarity indicator.

The all-steel stand is equipped with a two section porcelain lined metal drawer.

The milliampere meter (#1) is calibrated 0 to 10 and 0 to 100, with double reading scale. For treatments utilizing small amounts of milliamperage, the upper scale is read. For heavier dosage (above 10 M.A.) use the lower scale.

This change is made by means of switch #3 placed between meters. For upper scale, snap this switch up; for lower scale, down.

The double reading(both left and right from zero) is provided that the operator may quickly read the oscillations of the wave currents. Should the meter needle fail to turn to exact zero after treatment or at any time, this may be corrected by turning the small adjusting screw set in the center of the lower section of the meter frame either to Right or Left as indicated.

The volt meter (#2) is provided with single scale and reads from 0 to 150 both from left and right. There is no adjustment or control necessary in connection with this meter as with the milliampere meter. When the needle fails to turn to exact zero after treatment or at any time, this may be corrected by turning the small adjusting screw set in the center of the lower section of the meter frame either to Right or Left as indicated.

Nos. 4 and 5 are volume controls; #5 being the main volume control and #4 the vernier or auxiliary volume control. Volume Control #5 is used to adjust the current output to the patient at approximately the current desired and for finer adjustment, adjust switch #4. In other words, switches #4 and #5 work together, for example, with switch #5 on point 4 you will obtain a certain reading on the milliampere reading. This may be just a trifle more or less than you care to deliver, yet setting it back to 3 or up to 5 will either increase or decrease too much. Leaving control #5 on point 4 you will find that you can increase the volume slightly by turning #4 to the Right. By using both controls you can deliver to the patient exactly the amount of current desired.

Switch #6 regulates the number of surges per minute. This switch is directly connected to a sliding drive on the motor shaft and surges from 6 to 42 per minute may be obtained according to scale.

Switch #7 is the main operating switch. When pushed to right, the current is "on" -- to left, "off".

Switches Nos. 8 and 9 are current selectors. With the pointer on #9, set on 1, the machine will deliver either one of the five direct currents as indicated on left half on graphs on top plate (1-1; 2-1; 3-1; 4-1; or 5-1) depending on setting of selector #8. With #8 on 1 and #9 on 1, a straight galvanic current is produced. With #8 on 2 and #9 on 1, a galvanic surge is produced as indicated on graph 2-1. With #8 on 1 and #9 on 2, a rapid alternating current as indicated on graph 1-2 is produced, and so on. (10 combinations in all)

The distinctive and very valuable feature of this type of contruction over the cam mechanism is the fact that while with the cam the surges are only to be produced in multiples of a certain figure, as for example, 10, 20, 30, etc. with the Fischer Low Voltage and Wave Current Generator you can obtain any desired number of surges per minute -- 6 up to 42 -- without stopping the machine or without adding or removing any parts.

No. 10 is the pole changing switch. When administering galvanism it is often necessary to reverse the direction of the flow of current momentarily before removing electrodes; hence this handy pole changer.

No. 11 are patient's outlets. That outlet toward which switch #10 is pointing is always positive pole.

In construction this apparatus is distinctly simple and rugged. Each movable part is run at slow speed and the danger of wear is therefore reduced to a minimum. Ball-bearings are mounted at vulnerable points. Oiling is made simple and convenient. The contact brushes are easily replaced when necessary.

The Fischer Universal Low Voltage and Wave Generator is compact in construction and requires no installation service. The unit is shipped to you complete, and it is only necessary to connect the outfit to an electric current supply as indicated on the name-plate. No attachments need be added and nothing removed from the outfit as you receive it.

Good contact is very essential when using currents of low voltage, and

when a current of only 2 or 3 milliamperes is being used you should make absolutely sure that the cord tips, switches, electrode contacts, etc., are perfectly clean, and fit snugly.

A loose wire will sometimes be the cause of a great deal of inconvenience, as the current may be carried across momentarily and then broken again by vibration, etc.

Dirt or dust under the contact, or corrosion of the metal itself, will create so much resistance that a small amount of current cannot pass. Sometimes your patient will feel no sensation as a result of poor contact, until you have turned on a considerable volume of current -- enough to break down the interfering resistance -- and a disagreeable shock is the result.

Before disconnecting cords or electrodes, always be sure that your current has been entirely turned off at the machine.

TO OPERATE MACHINE

See that switch #7 is set left or off position. Set levers 8 and 9 at proper points to deliver currents as indicated on graph on center of top plate.

You will note the ball joint on the end of the cord is clipped firmly into place, and that regardless of how you may pull the cord in any direction, contact cannot be broken. You must actually grasp the roughened part of the cord tip in your fingers and lift it out to break contact. This is a very valuable feature as perfect contact is absolutely necessary where small amounts of current are being used.

The polarity switch No. 10 indicates flow of current. When pushed to Right "positive" current is delivered from outlet on that side. When pushed to Left, "positive" current is delivered from Left side.

The potential (voltage) obtained is observed on volt meter No. 2 and the volume of current on the milliampere meter No. 1. Volume of current is controlled by knobs Nos. 4 and 5, No. 5 being the major controller and No. 4 the vernier control to obtain finer and more accurate settings. When you close

switch No. 7, that is by pushing lever to Right, you let line current through apparatus.

When using the moist surface electrodes, be sure that they are first thoroughly saturated in warm water. Electrodes should be permitted to soak for some time (new electrodes as much as an hour and a half) before applying to the body. The next time you use these pad electrodes you will find that they will absorb the moisture much quicker.

THE FISCHER MODEL "J" UNIVERSAL LOW VOLTAGE GENERATOR

1-1 STRAIGHT GALVANIC

1-1 The straight galvanic (or direct and constant current) is preeminently a chemical current. No matter how many of the "57" or more varieties or modifications of the galvanic or direct current any certain make of low volt apparatus may conveniently evolve it is the straight galvanic that is invariably indicated for strictly chemical effect.

Electrolysis; removal of superfluous hair; absorption or improved resiliency of scar tissue; ionization of various chemicals; chemico-physiological sedation or stimulation (according to respective polarity), all these special effects are only to be primarily achieved through the chemical action of a smooth non-pulsatory galvanic or direct current.

To be effective, the galvanic current must be smooth. The Galvanic current furnished by this apparatus is smooth by test: and we have the infallible oscillographic records to prove it. And beside this achievement in smoothness, which means effectiveness, we have attained an accuracy and fineness of current regulation incomparably in advance of all former instruments.

Now you can use Galvanism for all of its many and varied uses -- without jerky, painful and inelegant sensations which have been responsible for discarding this energy in the past.

1-2 RAPID ALTERNATING 260 PER SECOND

1-2 The Rapid Alternating Current, 260 cycles per second, on account of its rapid polarity changes or reversals possesses no polarity or chemical effects. It is strictly mechanical in its action. However, owing to the very fact of its rapidity of alternations, it is indicated for a preliminary anodyne treatment of acutely sensitive sprains, myositis, neuralgia, preparatory to more physiologicall indicated but not so quickly alleviative applications.

When you sweep 260 oscillations per second through a muscle you get considerable mechanical response -- but the chemical response is practically eliminated. Exactly the requirements for simple, effective muscle massage where the electrolytic chemical actions must be eliminated.

2-1 GALVANIC SURGE

2-1 The Galvanic Surge possesses all the polarity characteristics of the straight galvanic but, on account of its intermittent -- though slow -- voltage rise and fall, is not so clearly indicated for intensive chemical effect. It is only useful, though quite valuably so where local polar effect is desirable concomitantly with a mechanical or contractile response, this latter being more accentuated or localized at the negative side.

It is an excellent current to favorably impress intestinal peristalsis; flabby musculature; and for combined chemical and mechanical effect upon scar tissue.

A contracting muscle gives rise to a surging electric current which can be measured and its curve traced: and a similar current, the surging galvanic, sent into the muscle, brings about the same kind of physiological contraction of the muscle. This is the energy that proves so useful when the muscles require stimulation to assist in re-coordinating the nerve-muscle action in the recovery from degenerations -- peripheral nerve injuries.

2-2 RAPID ALTERNATING IN SURGES

2-2 The Rapid Alternating Current in Surges possesses no polarity effects but elicits a decidedly strong contractile response.

It is useful to induce such effect through the respective spinal nerves. Indicated as a purely mechanical sequent treatment to the application of galvanism, aiding in the more speedy and general dispersion of electrolytic reaction, thereby obviating possibly resultant stasis or excessively prolonged hyperemia; and is also quite often indicated as adjunct treatment after short wave and infra-red.

3-1 GALVANIC DWELL SURGE 1/4 REST PERIOD

3-1 The Galvanic Dwell Surge with 1/4 rest period possesses strictly polar and chemical effects with a decidedly accentuated pull or contraction, the exertion being sustained for a 3/4 period and followed with a 1/4 rest. This current will be indicated in place of the galvanic surge whenever a more pronounced mechanical effort or pull is desirable and can be initially employed or substituted later when such accentuated action may be deemed advisable.

Sometimes a sustained contraction is desirable and of apparently much benefit. Bring the muscle to its state of contraction, keep it there a while, then release it.

3-2 RAPID ALT. IN DWELL SURGES 1/4 REST PERIOD

3-2 The Rapid Alternating in Dwell Surges with 1/4 rest period possesses no polarity or chemical action, whatsoever, and is therefore strictly mechanical in action, and to be employed wherever such effect is more powerfully indicated than with the 2-2 modification.

If you want sustained contraction and combined tonic (electrolytic) effect, 3-1; 5-1 gives a long rest instead.

4-1 SLOW SINUSOIDAL

4-1 The Slow Sinusoidal is not indicated for strictly chemical effect because

of its regularly reversing and nullifying alternating polarity, but -- on account of its extremely slow polarity reversals -- is decidedly trophic in effect, which, with the accompanying contractile stimulation, is therefore useful in the treatment of relaxed musculature; it may also be utilized for neuro-muscular diagnosis and treatment.

Useful for deep massage and apparently valuable in smooth muscle treatment.

4-2 RAPID ALTERNATING IN SURGES

4-2 Apparently the same as 2-2. Useful for inciting nerve reflexes through direct application to the spine; also as a mechanical stimulant or muscular massage after galvanism, short wave or infra-red treatments.

5-1 GALVANIC SURGE 2/3 REST PERIOD

5-1 The Galvanic Surge with 2/3 Rest Period is similar to 2-1 but with lessened chemical effect. On account of the prolonged and regular rest period it is indicated for the mechanical stimulation of delicate and sensitive structures concurrently with the trophic effect of the constant polarity. It is also useful where a slow rate of contraction may be physiologically required, as for intestinal stimulation.

5-2 RAPID ALTERNATING SURGE 2/3 REST PERIOD

5-2 The Rapid Alternating Surge with 2/3 rest period, possessing no polarity, is useful where strictly mechanical response through the nerve centers is desired. Owing to the prolonged, regularly recurrent rest period, this current modification may be beneficially applied for longer periods of treatment than is advised with the more usual surge and wave currents.

It furnishes an excellent passive, general or local, massage for the convalescent; far more pleasant, convenient, and satisfactory than massage.

If you require the effect without electrolytic complication you get it exactly with 3-2; and 5-2 for long rest periods.

STUDY THIS LITTLE SYNOPSIS

If it's smooth muscle, or degenerated striated muscle, the energy to consider is

1-1
2-1 from which you select according to the
3-1
4-1 additional needs -- polarity or electrolytic
5-1
effect, etc.

If it's just massage that is required, but a real, deep physiological massage that replenishes the blood supply of the muscle groups, that imparts vigorous tone, that nourishes by milking out the effete materials and provoking a gush of rich fresh blood, it's

1-2
2-2 from which you select according to the minor
3-2
4-2 needs required.
5-2

Every current meets a physiological purpose in a physiological way -- because we built the apparatus to provide stimuli which resemble the stimuli of physiologists, -- and users say we succeeded.

H. G. FISCHER & CO.
2323-45 Wabansia Ave.,
Chicago, Ill.

Form 1809

Type J. No B-35021.

SUGGESTED TECHNIC FOR

THE USE OF

LOW VOLT CURRENTS OF PHYSICAL THERAPY

AS PRODUCED BY

FISCHER MODEL "J"

B-35021

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of

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Physical Therapy Headquarters
2323-2345 Wabansia Ave.,
Chicago, Illinois

SUGGESTED TECHNIC FOR THE USE OF LOW VOLT CURRENTS OF PHYSICAL THERAPY

The technic suggested in the following pages is compiled after a careful perusal of many text books and a study made of the technic employed by the large number of prominent medical men using low volt current generators in an effort to suggest to the reader a basis of procedure to apply the low volt currents of physical therapy in conditions in which they are indicated. The technic is not offered to be followed to the letter, as conditions in individual instances will often alter methods of procedure, length of time of treatment, and the current used.

Careful study of the following suggested technic, together with reference to the chapters on physical effects and physics of the current suggested to be used, will enable the physician to work out intelligently his own technic for treating the case in hand, and to apply it with best possible results.

ADHESIONS

Post operative, intraabdominal and pelvic adhesions may often be prevented by using the Surging Sine Wave Current as soon as possible after wound is healed and acute symptoms subside, thus eliminating the long continued use of abdominal supporters.

Technic: Surging Sine Wave Current (2-2)
Surface electrode 5x8 on back opposite wound.
Surface electrode 4x5 over wound.
Set surge indicator on 15.
Current sufficiently strong to cause, first, mild contractions, gradually increasing strength with each successive treatment depending on the condition of the wound and the comfort of the patient.
Time of treatment, 10 minutes.
Frequency of treatment, 3 times weekly

ANKLE

(See Joints, Traumatic)

ANKYLOSIS, Partial

Technic: Short Wave Current or Diathermy to thoroughly heat the tissue and to increase circulation, followed by Surging Sine Wave Current - (2-2)
Surface electrode of proper size to cover area on each side or above and below the joint.
Set surge indicator on 36.
Current strength sufficient to deeply massage all musculature and to produce motion if possible.
Time of treatment, 10 or 15 minutes.
Frequency of treatment, 3 times weekly.

ASTHMA

When no cause is discovered, or when the cause has been treated by usual medical procedures, the following technic will often relieve the spasm with subsequent disappearance of symptoms.

Technic: Non-surging Sine Wave Current - (1-2)
Surface electrode 5x8 over sternum.
Surface electrode 3x9 over cervical vertebrae.
Current strength, comfortable toleration.
Time of treatment, 10 to 15 minutes.
Frequency of treatment, daily or more often as required.
When emphysema is present because of relaxed longitudinal muscles, the Surging Sine Wave Current will often give relief.

Technic: Surging Sine Wave Current - (2-2)
Surface electrode 3x6 over lower cervical and upper dorsal region.
Surface electrode 4x5 alternately over each lung.
Current strength, toleration of patient.
Set surge indicator on 16.
Time of treatment, 15 minutes.
Frequency of treatment, daily or more often as required.
This contracts the longitudinal muscles and expels the air from the lungs.

BRACHIAL NEURITIS

Acute

Brachial Neuritis is best treated by the galvanic current. In the acute stage, place the electrode on the back and on the anterior shoulder, with negative back, positive front. In sub-acute or chronic cases use the direct current with positive back, negative front, for ten minutes. If pain extends down the arm the seance may be divided between shoulder and forearm, using following technic:

Technic: Non-surging Galvanic Current - (1-1)
Rectangular electrode wrapped around wrist - Negative Pole.
Surface electrode 4x5 thoroughly saturated with hot water applied over clavicle - Positive Pole.
Current strength, 5 to 8 M.A. No more.
Time of treatment, 15 minutes.
Frequency of treatment, 3 times weekly, daily if severe.

Chronic cases: Above technic followed by Surging Sine Wave Current - (2-2)

Technic: Surface electrodes placed as above.
Depending on the case in hand, set surge indicator somewhere between 8 and 24.
Current strength, sufficient to contract muscles without too much pain.
Frequency of treatment, 3 times weekly.
The above technic may at first aggravate pain, which will subside after muscles have worked.
In acute inflammtory neuritis, the Sine Wave Current should not be used.

BROMIDROSIS

Technic: Galvanic Current - (1-1)
The feet are immersed in a solution of Sodium Chloride 5% and connected to negative pole. Glass tray used, with surface electrode in it. Large surface electrode is placed on the patient's lap, hands in contact with it - Positive Pole.

Current strength, tolerance.
Time of treatment, 30 minutes.
Frequency of treatment, twice weekly for three weeks.
Results that can be secured: In most cases relief is immediate. Lessening of amount of sweat. Acidity is neutralized.

BRONCHIECTASIS

Short Wave or Diathermy thru region of dilated Bronchus followed by:

Technic: Surging Sine Wave Current - (2-2)
Surface electrode 5x8 over chest approximating the location of dilated Bronchus.
Small surface electrode 3x3 over fourth and fifth cervical vertebrae.
Set surge indicator on 16.
Current strength, patient's toleration.
Time of treatment, 10 minutes.
Frequency of treatment, 3 times weekly.

BRONCHITIS

May be relieved by using the Surging Sine Wave Current.

Technic: Surging Sine Wave Current - (2-2)
Surface electrode 5x8 on back.
Surface electrode 4x5 below clavicle toward medial line.
Set surge indicator on 16.
Current strength, toleration of patient.
Time of treatment, 10 minutes.
Frequency of treatment, 3 times weekly, daily in the beginning if possible.

BURSITIS

Technic: Galvanic Current - (1-1)
Small pad electrode placed over the bursa - Negative Pole.
Large pad electrode placed on calf of leg - Positive Pole.
Current strength, tolerance.
Time of treatment, 20 minutes.
With electrodes in same position switch to Rapid Alternating Surge - (4-2). Time of treatment, 5 minutes.
Frequency of treatment, 3 times weekly.

The above treatment is used in both acute and chronic stages. As a rule this condition is cleared up in nine treatments.

Results that can be obtained: In acute stage, the pain can be relieved immediately. The swelling can be reduced. In the chronic stage the fibrous bursa can be softened and broken up. The frequent inflammatory attacks can be relieved and terminated.

CERVIX, Stenosis of

Technic: Non-surging Galvanic Current - (1-1)

Use uterine dilators varying from 6 to 20 (French size), the smallest is to be used first. Dilators must be insulated to within 1½ inch of tips with rubber tubing. The dilator is inserted to insulation - Negative Pole.
Surface electrode 5x8 to lower abdomen - Positive Pole.
Current strength, 3 to 5 M.A.
Time of treatment, 5 to 10 minutes,
Frequency of treatment, every ten days, using slightly larger dilator each treatment. Never force the dilation. Negative pole will soften the tissue and permit dilator to enter without pressure. Most gratifying results can be accomplished by this method of treatment.

CHILBLAINS

Technic: Galvanic Current - (1-1)
Pad electrode over affected area - Negative Pole.
Large indifferent electrode higher up on the leg - Positive Pole.
Current strength, tolerance.
Time of treatment, 15 minutes.
Frequency of treatments, daily if possible, for one week. Then twice weekly for two weeks.
General stimulation of feet and limbs can be given.
Results that can be obtained: Pain is relieved, inflammation and swelling decreased, congestion and stasis relieved, and tingling and itching can be relieved.

ELECTRO-DIAGNOSIS

(See Form #1336)

DEAFNESS, Chronic

Technic: Non-surging Galvanic Current - (1-1), followed by Surging Sine Wave Current - (2-2)

Cotton saturated with saline solution, placed in one or both ears, contact made to cotton with metal electrode designed that it may be readily held in place. No metal must touch the ear. Connect thereto the negative pole of the Non-surging Galvanic Current - (1-1)

Surface electrode on neck, or large electrode, covered with cotton, in contact with tongue, or pillars of fauces - Positive Pole.

Current strength, 1½ M. A.

Time of treatment, with Non-surging Galvanic Current, 15 minutes, followed immediately by mild surging Sine Wave Current, to same electrode in position.

This technic is recommended highly as one of the best which has been advanced for treatment of deafness.

DYSMENORRHEA

Unmarried Women

Technic: Non-surging Galvanic Current - (1-1)

In dysmenorrhea, the success of the treatment will depend on the accuracy of diagnosis and the cause which may be either ovarian or uterine misplacement, or stenosis of the cervix. Stenosis of the cervix, especially in young and unmarried women, is the most common cause (see the technic for Cervix, stenosis of). By carefully following this procedure, the use of the Galvanic Current will produce permanent dilation of the cervix. The results obtained by the use of the Galvanic Current are in marked contrast to those obtained by the more common method of forcible dilation under anesthetics, the result of which is only temporary.

For other causes the following technic is suggested:

Technic: Surface electrode 5x8 on abdomen - Positive Pole.

Surface electrode 4x5 on back or with carbon rectal electrode, covered with cotton, in place - Negative Pole.

Current strength, 10 to 12 M. A.

Time of treatment, 10 minutes.

Frequency of treatment, apply treatments two days in succession preceding menstruation, and three times weekly following menstruation.

Married Women

Technic: Non-surging Galvanic Current - (1-1)

Vaginal carbon electrode, covered with cotton, in place - Negative Pole.

Surface electrode 5x8 on abdomen - Positive Pole.

Current strength, 10 to 12 M. A.

Frequency of treatment, same as for unmarried women.

If accompanied by stenosis of cervix, treat the cervix using technic suggested under Cervix, Stenosis of, on page 3.

ELBOW

(See Joints, Traumatic)

ENDOMETRITIS, Acute and Chronic

When accompanied by pain and hemorrhage. The usual method of treatment has included dilation of the cervix and the use of the curette to remove the granulations and vegetations. A much more satisfactory method of treatment is presented in the use of galvanism, the electrolytic action of the current destroying the granulations and vegetations. The antiseptic and tonic properties of the negative pole aid materially to accomplish healthy reproduction.

Technic: Non-surging Galvanic Current - (1-1)

Amalgamate copper intrauterine electrode, placed in position into the uterus and supported that it does not come in contact with, and well insulated from the vaginal walls - Positive Pole.

Surface electrode 5x8, well moistened, placed on the lower abdomen - Negative Pole.

Current strength, not to exceed 10 M. A.

Time of treatment, 15 to 20 minutes.
Frequency of treatment, once each week.

EROSIONS, of the Cervix Uteri

Treat first as for Endometritis, followed by one of the three suggestions below:

Technic: Non-surging Galvanic Current - (1-1)

(1) Zinc or copper ball electrode placed in position in contact with the surface of the cervix - Positive Pole.
Surface electrode 5x8 on abdomen - Negative Pole.
Current strength, 5 to 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, every fourth day.

(2) If no zinc or copper ball electrode is at hand, use carbon ball electrode, covered with cotton saturated in 2% solution of zinc sulphate - Positive Pole.
Surface electrode 5x8 on abdomen - Negative Pole.
Current strength, 10 to 15 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, same as above

(3) If erosions bleed easily, always use the copper metal electrode to the cervix - Positive Pole.
Technic as above.

EYELIDS, Granulated

Technic: Non-surging Galvanic Current - (1-1)
A small tip copper electrode - Positive Pole.
Surface electrode 4x5 on chest or back - Negative Pole.
Evert the eyelid, holding the positive electrode as one would hold a pencil. Gently rub it over the granulated membrane. Have assistant gradually turn on the current until 1 M. A. is reached.
Time of treatment, until granules are coated a greenish gray.
Frequency of treatment, once each 4 or 5 days.

EYE STRAIN

Technic: Non-surging Galvanic Current - (1-1)
Moist gauze pad placed over the eyes - Negative Pole.
Surface electrode 4x5 on the back - Positive Pole.
Current strength, 2 to 3 M. A.
Time of treatment, 5 minutes.
Frequency of treatment, once each week.

FLAT FOOT

Technic: Straight Galvanic Current - (1-1)
Pad electrode 3x3 on dorsum or top of the foot.
Pad electrode 3x3 on plantar surface (sole).
Current strength, tolerance.
Time of treatment, 15 minutes.
With electrodes in same position, switch to current (5-2)
Surge indicator set on 35.
Current strength, tolerance.
Time of treatment, five minutes, and increase three minutes at each visit. Time limit twenty minutes.
Frequency of treatments, three times weekly for first two weeks; then decrease to twice a week for three weeks.

(Note)The above is the first treatment given. Immediately following this treatment there is relief of pain, and the foot feels loose and can be moved freely by the patient. This treatment rarely fails in producing immediate relief of pain, and satisfying the patient. The relief of pain is not temporary, for the interfering

fibrosis has been softened and broken up. The treatment should be followed by Diathermy.

GOITRE, Adolescent

The treatment of adolescent goitre differs from that of cystic goitre and usually causes disappearance.

Technic: Non-surging Galvanic Current - (1-1)
Surface electrode 5x8 on the back between the shoulders - Positive Pole.
Surface electrode 3x3 well saturated with warm water, to which has been added several drops of tincture of iodine - Negative Pole.
Current strength, 5 to 7 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, 3 times weekly.

HEMORRHOIDS

Carbon electrodes may be obtained in three sizes, that a smaller size may be inserted in the beginning followed by the larger sizes, as treatment of the case progresses.

Technic: Non-surging Galvanic Current - (1-1)
(No.1) Surface electrode 5x6 placed on the abdomen - Negative Pole.
Carbon ball electrode in position - Positive Pole.
Current strength, 5 M. A.
Time of treatment, 5 minutes.
Frequency of treatment, twice weekly; or

Technic:
(No.2) Non-surging Galvanic Current - (1-1)
Place patient on table in Sims' position.
Positive pole attached to surface electrode about 5x8", patient lying on pad.
Special Harvey electrode attached to negative pole.

Hemorrhoids are strained out or treated through a Brinkerhoff Speculum. Electrode (needle) is thrust into top of hemorrhoid until insulating medium comes in contact with surface. If you are using the new Harvey type needles with the special bakelite insulation, such needle is inserted until the tapered insulation itself is passed through the wall of the hemorrhoid until the larger diameter encounters the outer surface.

Current strength, turn on gradually to 5 M. A. After a moment slowly increase to 10 M. A.

Time of treatment, 5 to 10 minutes.

Indications of progress of treatment are white bubbles of hydrogen, and dark lines radiating from place of puncture. Hemorrhoid changing to dark purple indicates treatment complete. Each hemorrhoid is treated separately.

HYPERTRICHOSIS, Superfluous Hair

Technic: Non-surging Galvanic Current - (1-1)
Surface electrode 4x5 under patient's hand - Positive Pole.
Attach Hayes' bulbous pointed steel needle in needle holder - Negative Pole.
Current strength, $\frac{1}{4}$ to 1 M.A. on each follicle.
Time of treatment, about 2 to 5 seconds.

The current is adjusted before treatment is begun. Insert the needle to base of follicle and then have patient put his hand on surface electrode lying on a table, closing circuit in this manner. This procedure gives little sensation to the patient. Hold epilation forceps in the other hand ready to remove the hair. Generally a bit of froth will appear at the base of a follicle. If hair does not epilate at a touch from the forceps, repeat the treatment at once. If it still does not come out, pull out forcible, otherwise it will develop an irritating reaction. After removal of hairs, it is well to apply the positive pole connected to a carbon electrode covered with cotton soaked in 1% solution of sodium bicarbonate over the

epilated area. This procedure neutralizes the alkaline caustic liberated under the above negative treatment. The negative pole of course is connected to the pad under the hand in this secondary treatment.

INTESTINAL STASIS AND PTOSIS

In nearly all cases of colonic distortion when the transverse colon alone is found sagging the cause may be traced to ptosis of the stomach. If the stomach is affected and there is no evidence that the digestive tract below fails to function normally, treatment should be confined to the stomach.

Technic: Surging Sine Wave Current - (3-2)
Surface electrode 5x8 on spine over nerve supply.
Surface electrode 4x5 over stomach.
Current strength to comfortable contraction.
Time of treatment, 10 minutes.
Frequency of treatment, twice weekly.

IRITIS, Chronic

Technic: Non-surging Galvanic Current - (1-1)
Surface electrode 4x5 on back of neck - Positive Pole.
Gauze pad well saturated placed over closed eyelid - Negative Pole.
Current strength, 2 to 3 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, every day for three days, then alternate days.
This treatment may be preceded with radiant light for 20 minutes over closed eyelids, to advantage.

JOINTS, Traumatic

The following treatment is exceedingly valuable in treating stiff joints as elbow, ankle, knee or shoulder following fracture or inactivity due to the application of splint or sling, sprains or bruises.

Elbow

Technic: If elbow is bent, Surging Sine Wave Current - (2-2)
(1) Surface electrode 4x5 to back over upper dorsal region.
Surface electrode 3x3 over back of elbow on insertion of the triceps.
Set surge indicator on 36.
Current strength, enough to forcibly contract extensors and rhythmically straighten arm.
Treat daily as soon after splint is off as possible, beginning cautiously so as not to rebreak the recent injury.
Time of treatment, 5 minutes, gradually increasing to 15 minutes as treatments progress.
Frequency of treatment, 3 times weekly.

Technic: If elbow is straight, surface electrode 4x5 on the back.
(2) Surface electrode 3x3 on insertion of the biceps.
Set surge indicator on 36.
Strength of current, same as above.
Time of treatment, same as above.

Ankle

Technic: Surging Sine Wave Current - (2-2)
Surface electrode 4x5 under the foot.
Surface electrode 3x3 on back of leg.
Set surge indicator on 40.
Current strength, sufficient to extend the foot.
Time of treatment, 5 minutes in this position and then change electrode on back of leg, to the insertion of tibiaslis anticus.
Current strength, same as for elbow.
Time of treatment, same as for elbow.
Frequency of treatment, same as for elbow

Knee
Technic: Surging Sine Wave Current (2-2)
Surface electrode 3x3 on each side of knee.
Set surge indicator on 32.
Current strength, sufficient to deeply massage the joint.
Time of treatment, 3 minutes, then move pads placing one over and one under the knee. Treat again for 3 minutes, then move pads to one above and one below the knee anteriorly. Treat again for 3 minutes.
Current strength, same as above.
Frequency of treatment, 3 times weekly.

Shoulder
Technic: Surging Sine Wave Current - (2-2)
Surface electrode 3x9 between the shoulders on the back.
Surface electrode 4x5 to upper arm.
Set surge indicator on 32.
Current strength sufficient to move shoulder joint.
Time of treatment, 10 minutes.
Frequency of treatment, 3 times weekly.

LUMBAGO, Acute or Chronic

Acute
Technic: Non-surging Galvanic Current - (1-1)
Surface electrode 4x5 on back over lumbar region - Positive Pole.
Surface electrode 5x8 on abdomen - Negative Pole.
Current strength, 10 to 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, 2 or 3 times weekly, as required.

Chronic
Technic: Surface electrode 5x8 on abdomen - Positive Pole.
Surface electrode 4x5 on back - Negative Pole.
Current strength, 10 to 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, 2 to 3 times weekly.
Follow by Non-surging Sine Wave Current (1-2) to comfortable toleration.

MENORRHAGIA
Technic: Non-surging Galvanic Current - (1-1)
(1) Surface electrode 5x8 over abdomen - Negative Pole.
Intrauterine copper electrode inserted in uterus - Positive Pole.
Current strength, 5 to 8 M. A.
Time of treatment, 15 minutes.
Use 10 M. A. first treatment, and increase 1 minute each treatment, giving treatment once a week.
Technic: Surface electrode 5x8 on abdomen - Negative Pole.
(2) Carbon ball electrode covered with cotton inserted into Vagina - Positive Pole.
Current strength, 10 to 15 M. A.
Time of treatment, 20 to 30 minutes.
Frequency of treatment, twice weekly.
Technic: Surface electrode 5x8 on abdomen - Positive Pole.
(3) Surface electrode 4x5 on sacrum - Negative Pole.
Current strength, 15 to 20 M. A.
Time of treatment, 30 minutes.
Frequency of treatment, 3 times weekly.

METATARSALGIA
Technic: Galvanic Current - (1-1)
Small pad electrode on ball of foot - Negative Pole.
Small size electrode on top of foot.
Time of treatment, 15 minutes.
With electrodes in same position turn to (1-2)
Time of treatment, 5 minutes.
Then place small electrodes at the origin and insertion of transverse pedis muscles. Connect electrodes to current (4-1).
Set surge indicator on 36.
Time of treatment, 5 minutes.
Current strength, enough to produce distinct rising of the arch at each contraction of the current.
Frequency of treatments, twice weekly for four weeks.
Results that can be obtained: Immediate relief of pain. Adhesions can be loosened and broken up. Musculature strengthened.

NEURALGIA, Acute
Technic: Non-surging Galvanic Current - (1-1).
(1) Surface electrode 5x8 on back or abdomen - Negative Pole.
Surface electrode 4x5 over affected area - Positive Pole.
Current strength, gradually increased to 5 M. A.
Time of treatment, 30 minutes.
Frequency of treatment, three times weekly.
Technic: Surface electrode 5x8 on back or abdomen - Negative Pole.
(2) Pad covered with gauze soaked in 2% quinine bichloride - Positive Pole.
Current strength, gradually increased from 5 to 8 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, repeat for one or two days as necessary.

NEURITIS, Acute Inflammatory
Technic: Non-surging Galvanic Current (1-1)
Place one surface electrode 4x5 above and one below painful area.
Current strength, 10 to 15 M. A.
Time of treatment, 30 minutes.
Frequency of treatment, three times weekly.

Chronic
Technic: Non-surging Pulsating Direct Current - (1-2)
Surface electrode 5x8 on back - Positive Pole.
Surface electrode 4x5 covered with gauze saturated with 2% sodium salicylate - Negative Pole.
Current strength, in back or legs, 10 to 15 M. A.
Current strength, about the head or face, not to exceed 5 M. A.
Time of treatment, 20 minutes.
Frequency of treatment, 3 times weekly.

NEURITIS OF ARM
Technic: Non-surging Galvanic Current - (1-1)
Surface electrode 5x8 over nerve supply on spine - Positive Pole.
Surface electrode 4x5 at wrist - Negative Pole.
Current strength, 8 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, daily if necessary.

OTITIS MEDIA
Cleanse the ear with zinc solution prior to treatment.
Technic: Non-surging Galvanic Current - (1-1)
Fill the ear with warm non-isotonic solution of zinc sulphate.

Insert hard rubber or glass speculum with a zinc wire or narrow strip of metal passed through as a positive electrode. Be careful to keep the wire just within the insulation so as to avoid danger of contact with aural tissue - Positive Pole.

Surface electrode 4x5 on shoulder or arm of side affected - Negative Pole. This avoids possible vertigo by lateral passage of current through the brain.

The Fischer Self-Retaining Ear Speculum obviates the necessity of holding the device in the ear canal by hand. This Self-retaining Ear Speculum is mounted on a headband which also has an indifferent electrode mounted in the inner side, doing away with the large pad on the shoulder or arm. A leather band is easily placed around the head, with the speculum directed into the ear canal to be treated.

Current strength, increase gradually from 2 to 5 M. A.

Time of treatment, 10 minutes.

Prescription for Non-Isotonic Solution

Zinc Sulphate, gr. viiss
Glycerine, min. xcvi
Water, ad. oz. iiiss
Sig:-Dilute with equal quantity of warm water before using (Friel)

PARALYSIS

In all forms of Paralysis, the treatment to be selected depends upon the degree of nerve injury present. The current must pass through the affected muscle or muscles lengthwise, never transversely. A general rule to follow in attaching electrodes is to place one over the spinal nerve supply, controlling the muscles affected, and the other beyond or to the extremity of the disability.

For example: In treating paralysis of the arm, whatever may be the cause, place an electrode on the back over the 6th to 8th dorsal vertebrae, with the other in the palm of the hand or on the wrist, using the positive pole on the spinal nerve exit in the acute or painful cases. In chronic cases, apply the negative pole to the spine.

In treating paralysis of the leg, the same general procedure is carried out. It is undesirable to cause stimulation of paralyzed muscle for a period of over ten minutes to prevent possible fatigue.

PROSTATIC, Enlargement

Technic: Surface electrode 5x8 on abdomen.
Prostatic Electrode inserted through the rectum against the prostate.
Apply diathermy to heat the part to comfortable toleration.
Follow with Surging Sine Wave Currents (2-2) - same electrodes in place.
Set surge indicator at 40.
Current strength, sufficient to definitely sense contraction in the rectum.
Time of treatment, 10 to 15 minutes.
Frequency of treatment, 3 times weekly.

PRURITIS ANI

Technic: Non-surging Galvanic Current - (1-1)
Shape a piece of zinc or block tin (about $2\frac{1}{2}$ inches in diameter) so that it fits between the nates.
Place over this zinc or tin electrode, a thick pad of gauze well saturated with isotonic solution of zinc sulphate - Positive Pole.
Surface electrode 5x8 on the back - Negative Pole.
Increase current gradually to 4 or 5 M. A.

Time of treatment, 20 minutes.
Frequency of treatment, as indicated.
If there is a great deal of thickening of membrane which does not respond to zinc ionization, use Lugol's solution with the same technic EXCEPT where Lugol's solution is being used the negative pole is attached to the active electrode between the natos, and the positive pole to the 5x8 surface electrode on the back.

RAYNAUD'S DISEASE

Technic: Non-surging Galvanic Current - (1-1)
Surface electrode 5x8 at nape of neck - Positive Pole.
Foot in foot baths of water - Negative Pole.
Current strength, 10 to 15 M. A.
Time of treatment, 20 minutes.
Frequency of treatment, daily.
This treatment may be preceded with short wave to good advantage.

RECTUM, Lack of muscle tone

Technic: Surging Sine Wave Current - (2-2)
Metal rectal bi-polar electrode in rectum, to which both wires are attached. Set surge indicator on 24.
Current strength, sufficient to contract muscles of the rectum.
Time of treatment, 5 to 10 minutes.
Frequency of treatment, daily for 3 days then 3 times weekly.

RETINAL HEMORRHAGE

Technic: Non-surging Galvanic Current - (1-1)
Surface electrode 4x5 on back of neck - Negative Pole.
Gauze pad moistened in warm water over eyes - Positive Pole.
Current strength, 2 M. A.
Time of treatment, 8 minutes.
Frequency of treatment, 3 times weekly.

RHINITIS, Hypertrophic

Technic: Non-surging Galvanic Current - (1-1)
Double a piece of copper wire on itself about three inches back from the terminal. Wrap wire with cotton saturated with solution of adrenaline chloride.
Insert this as far back in the nose as possible - Positive Pole.
Surface electrode 5x8 on back at cervical region - Negative Pole.
Current strength, 2 to 5 M. A.
Time of treatment, 5 minutes.
Frequency of treatment, 3 times weekly.
With this technic we secure the astringent effect of adrenaline and the antiseptic and astrigent effects of copper. If both sides are affected, treat each side separately. A rapid improvement can be expected.

RODENT ULCER

Technic: Non-surging Galvanic Current - (1-1)
For small ulcers:
Thoroughly cleanse the ulcer with solution of hydrogen peroxide and cover the area with a pad soaked in non-isotonic solution of zinc sulphate.
This is covered with zinc plate to which is connected the positive pole. The plate must be held firmly in place.
Surface electrode 5x8 on the back - Negative Pole.
Current strength, 2 to 4 M. A.
Time of treatment, 20 to 30 minutes.
A reactionary inflammation will result. This can be soothed by a dressing of 5% solution of magnesium sulphate. Treatment can be repeated in three weeks if ulcer has not entirely healed.

SCAR TISSUE

Technic: Non-surging Galvanic Current - (1-1)

(1) Saturate thick gauze pad in 1% solution of sodium salicylate, sodium iodide or sodium chloride, or 1% potassium iodide.

Place gauze over saturated surface electrode 4x5. Apply this electrode over scar tissue - Negative Pole.

Surface electrode 5x8 placed on any convenient distant point, preferably opposite the scar - Positive Pole.

Current strength, 10 to 15 M. A.

Time of treatment, 30 minutes.

Frequency of treatment, daily or three times weekly.

ULCERS

(See Rodent)
(See Varicose)

UTERINE, Fibroid

The electrical treatment of diseases of women has one element in it, which prevents it from ever being looked upon with favor by the surgeon. While just as much diagnostic skill is required, as in surgery, electrical treatment unfortunately, requires an enormous amount of time, comparatively speaking.

The diseases and functional disturbances which are amenable to successful treatment by electricity are

Amenorrhea, Dysmenorrhea, Menorrhagia, Cellulipis, Non-Purulent Salphingitis, Endometritis, Metritis, Subinvolution, Superinvolution, Uterine fibroids, Deficient development, Stenosis of the Cervix and Uterine Misplacement.

In giving technics for the use of electricity on any part of the body, it has to be assumed that the diagnosis is sufficiently clear, and that the operator is equally cautious that he may not invade pathological areas where the current would be useless or do positive harm. Nowhere should the above statement be so strictly followed as about the delicate structure of the Uterine Appendages. The following suggestive technic outlines procedures which apply to the majority of cases; the dosage required is of great importance.

Fibroids of the sub-mural or sub-peritoneal variety, those large enough to cause obstruction of any consequency, or a rapidly growing one, in a patient under thirty-eight, are strictly surgical.

With an average case of Interstitial Fibroid, whether hemorrhagic or otherwise, the proper technic being pursued, the patient can be made symptomatically well, with a tumor diminished more or less, according to the faithfulness with which she continues her treatment, until pronounced unnecessary.

The growth will disappear no more than will the Uterus, as it is a part of it, but a diminution in size to the extent of relieving pressure, and putting a patient who constantly complains of discomfort, into a condition of comparative ease, will result. What more could a reasonable person expect when the possible dangers of surgery are confronted?

Technic: Non-surging Galvanic Current - (1-1)

Cover carbon ball electrode with absorbent cotton moistened with some antiseptic solution, or better antiseptic gauze moistened to complete saturation for good conduction. Do not use vaseline or other demulcents of an oily nature

as would interfere with passage of the current. Non-irritating surgical soap is good.

Place the electrode firmly against the best presented surface of the tumor. Place moist surface electrode 5x8 thoroughly saturated in warm water, in position. Be sure every inch of its surface bears firmly on the skin.

Connect positive pole to carbon ball electrode.
Connect negative pole to surface electrode.
Current strength is then gradually increased until a current of 20 to 30 M. A. is passing, depending on sensation and toleration of patient. Do not exceed 30 M. A.

It is best, in susceptible hypersensitive patients, to hold about two-thirds of the intended dosage for a period of 2 minutes and as skin becomes moistened, and the resistance thereby lessened, increase to full doses.

Time of treatment, average 15 minutes.
Frequency of treatment, as indicated.

If the fibroid is situated anteriorly or laterally, the point of contact should be adjusted accordingly, so that the current may penetrate upon it from the abdominal electrode: If it is not a hemorrhagic case, the internal electrode may remain in place and a Non-Surging Sine Wave Current (1-2) use through the back, for its local tonic sedative effect, rather than any special action on the tumor itself. The abdominal electrode, during the use of the Sine Wave Current, would of course have to be removed. If a longer period than twenty minutes is permitted for a galvanic current to pass through the tumor, it is quite possible that the patient may complain of a deep seated pain, which would be due to the contractile inter-polar action.

A word of caution here is necessary: if the patient complains of a deep pain or feeling of soreness after the current is turned on, ascertain at once if there is a pus tube, or adhesions about the cecum or elsewhere, from which harm might come, if the treatment is persisted in. Possible discomfort might be caused by the vaginal electrode pressing a little too firmly; release it slightly to remove the difficulty.

UTERUS, Infantile

Married Women

Technic: Non-surging Galvanic Current - (1-1)
Surface electrode 5x8 placed on abdomen - Positive Pole.
Carbon ball electrode covered with cotton saturated with water placed high in the vagina - Negative Pole.
Current strength, 8 to 12 M. A.
Time of treatment, 10 to 30 minutes.
Frequency of treatment, twice weekly.

Unmarried Women

Technic: Surface electrode 5x8 over sacrum.
Surface electrode 4x5 over lower abdomen.
Current strength, 8 to 15 M. A.
Time of treatment, 30 minutes.
Frequency of treatment, 3 times weekly.
Both technics should be followed by Surging Sine Wave Current - (4-2) surface electrodes.
Set surge indicator on 56.
Current strength, sufficient to sense contraction.
Time of treatment, 10 minutes.
Frequency as above

H. G. Fischer & Co.

2333-43 Wabansia Ave.
Chicago, Illinois

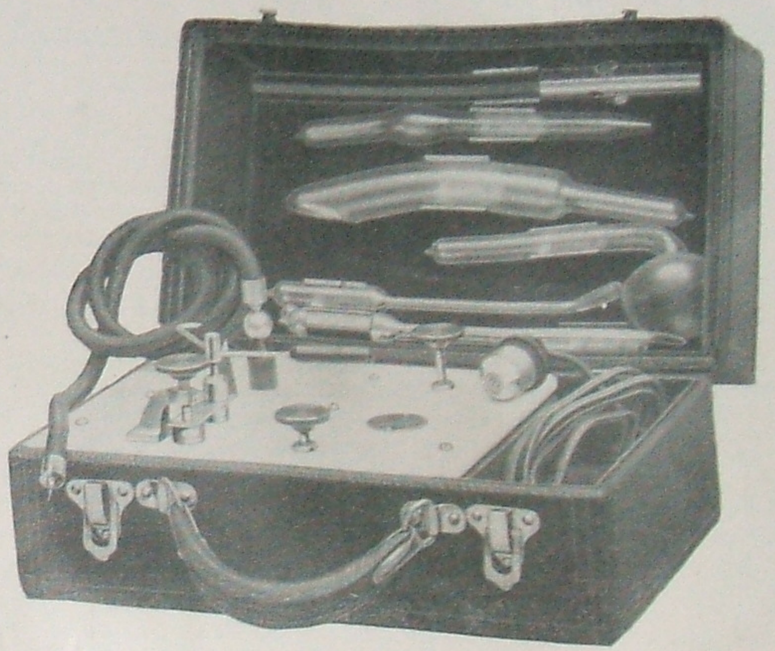
Type "F" Instructions

F

TYPE "F" COIL

Is guaranteed for a period of 2 years from date of purchase against inherent defects

FORM 120



Type "F"

Complete Physician's Portable High Frequency and Violet Ray Generator

Manufactured by

H. G. FISCHER & CO.

2333-43 Wabansia Avenue

CHICAGO, ILL.

What Are High Frequency Currents?

This Question Made Clear in a Graphical Way By Comparison With Water

In our demonstration we will assume that the voltage will be the water pressure at the hydrant. When we increase the pressure we increase the amount of water we can draw, due to the speed with which the water flows.

The voltage obtained from Type "F" coil is 60,000 volts, or approximately 600 times the voltage of the average electric lamp used. If you were to touch both terminals of a lamp socket, you would receive a severe muscular shock, though the voltage of the current would be only one-six hundredth of what you would receive from Type "F" coil.

Let us see what 600 times the pressure of the water at the hydrant would mean. Upon opening the faucet, a stream of water would travel at such speed that anything brought into contact with it would be struck as with a blow from a sword.

This same condition would prevail if electrical currents of 60,000 volts were permitted to enter the human body. It would be as a sword thrust that would cleave from head to heel.

Now let us take this tremendous pressure and force the water through an atomizer with hundreds of thousands of tiny holes. The result would be a mist of spray that would permeate the entire surrounding atmosphere. The most delicate flowers would be refreshed and would thrive, when treated in conditions produced in this manner.

In the generation of high frequency currents, an electrical condenser is connected in the circuit, acting as does the atomizer, in separating the flow into minute impulses of such rapid succession that no sensation affects the nervous centers. Likewise there is no muscular contraction.

The human nervous system can detect oscillations in an electrical current up to 10,000 per second, and as the frequency increases, the sensation decreases. Type "F" has a frequency of over **one-half million** per second.

The physician therefore has at his command a tremendously powerful agent which he can apply safely to his patients, giving them in a few seconds more benefit than with hours of the one time popular battery outfit.

WHAT ELECTRICAL PROGRESS MEANS TO THE MODERN PHYSICIAN

The study of the application of high potential, high frequency currents, has opened a field of unlimited possibilities unknown to most physicians. However, at the present time with up-to-date methods in the generation and use of these valuable electrical currents, every physician is confronted with the fact that a new science has been in process of development. It is now a well established fact that by no other application of electricity can such profound physiological results be obtained.

Almost every doctor has had an old battery outfit for administering the galvanic and faradic currents, but so limited has been the therapeutic use of these batteries that they have been in almost every case discarded, not as useless, but because results did not warrant any further investigation on the subject.

Not so, however, with the modern high frequency violet ray current of today. A great many of our ablest physicians and conscientious investigators have recently written volumes on the subject; and with all this literature and up-to-date equipment at the command of the modern Physician, he has in these highly developed electrical currents as now perfected one of the most powerful and wonderfully successful agents that has ever been placed in his hands for combating disease and restoring the human body to its normal healthy physical condition.

The term High Potential is merely indicative of high pressure or voltage, the same running in various treatment machines as high as from 30,000 to 60,000 volts.

The wonderfully beneficial results that progressive physicians nave recently been enabled to obtain with modern high frequency violet ray currents as now perfected and produced by our Type "F" Generator, covers such a wide range of diseases, and in very many cases the effect is so marvelous and satisfactory, that it is plainly a duty that every intelligent physician owes to himself, as well as to his patients, to provide his office with this most useful and modern equipment—**and his patients expect it.**

The worth of a tool like a promissory note, depends upon the name of the maker. Type "F" is backed by experience and a maker whose guarantee assures you that you have the BEST that can be made.

There is no quackery or uncertainty about the high frequency current and it is not put forward as a cure-all. It is a thorough cell massage and a healthful stimulant and its intelligent use is a wonderful aid in restoring to normal the physical condition that may have been impaired from most any cause. The results obtained are almost universally beneficial and never harmful.

The practitioner, once initiated into the results obtained from the use of high frequency high potential violet ray currents such as generated by Type "F," finds their use absolutely indispensable.

We pride ourselves in the extreme **high** frequency produced by Type "F" Violet Ray Generator. We have a current here that the physician can use with absolute safety to himself and his patient, and rest assured that he has done all that can be done in the shortest possible time.

Type "F" is not a toy, and we want to call your attention to the fact that when button "E" is pressed to bottom, you have a powerful current to deal with. A current that may aggravate or even burn your patient, when used where not indicated. (We refer chiefly to internal treatments.) Therefore we say play safe, doctor, and remove button "E" entirely when you are doing delicate work. This will positively assure you that you are using currents of **highest** possible frequency.

No other outfit has this feature, and the physician using other outfits is compelled to regulate as best he can with a current of medium power, which is neither high nor low enough in frequency to cover all cases.

Bear in mind that all internal treatments must be made with extreme high frequency to avoid discomfort to the patient and Plug "E" **must** be pulled out.

Another feature combined in every Type "F" is a Tesla Coil protector, which insures long life and enables us to guarantee it for twice the length of time of any other coil. Hence our statement, **"it will outlive you."**

Type "F" outfit is substantially built upon **White Italian Marble,** and is inclosed in a **plush** lined case with **steel Valence.** The outer trimmings being of **brass** heavily nickel plated.

GENERAL INSTRUCTIONS

For the Use of High Frequency Violet Rays Generated by Type "F" Outfit

We recommend the more detailed method of instruction as given in the following text-books:

High Frequency Manual.....	Eberhart..	$4.00
High Frequency Currents.....	Strong....	4.00
Currents of High Potential.....	Snow.....	5.00

The following are a few suggestions for treating diseases taken from cases where physicians have obtained excellent results. Not all of them through high frequency alone, but as a valuable adjunct in the treatment thereof.

Abscesses—Electrode No. 1. Keep in contact with skin and treat for 5 to 7 minutes with medium spark high frequency current.

Acne—The fulguration electrode No. 20 is used for quickest results. Cauterize the larger pustules and treat the entire surface affected with the No. 1 Electrode for a few minutes.

Acne Rosacea—Electrode No. 1 or No. 2. Medium frequency. Keep electrode away from surface to get cauterizing effect of spark. Duration of treatment to be decided by severeness of case. Where much surface is to be covered, lengthen time to 10 minutes.
Read Eberhart's Manual.

Alopecia—Electrode No. 1 or No. 11. Use medium frequency over the scalp for 5 minutes. If current is too strong, use higher frequency and lengthen the time.

Anus, Fissue of—Electrode No. 2 is to be used. Treat about 4 to 6 minutes with high frequency current as strong as patient can bear without discomfort.

Arteriosclerosis (Hypertensia)—Daily treatments of 5 to 8 minutes with No. 1 electrode highest frequency will serve to lower the blood pressure.
Read High Frequency Currents, by Strong.

Diagnosis like criticism is of little avail, unless it travels hand in hand with Remedy, Treatment and Cure.

Atrophy of Optic Nerve—Electrode No. 8. Highest frequency. Apply directly to closed eyelid for 2 to 4 minutes every other day.

Barber's Itch—General treatment with No. 1 Electrode for 5 minutes, daily if possible.

Boils—Electrode No. 1. Apply strong spark of medium or high frequency through gauze or about one-fourth inch from surface. Fulguration with milder spark can also be employed with boils not discharging, after which the ozone spray is recommended.

Brain Fag—Same treatment as for lowering blood pressure. When blood pressure is low, permit breathing through ozone generator.

Bronchitis—Ozonize the air with ozone generator. This is the simplest and most effective method.
Sharp sparks over chest and back sufficient to produce reddening give relief.

Bunions—Use No. 7 Bunion Electrode, medium high frequency, 6 to 8 minutes. Keep in contact with skin. Relieves all pain.

Callouses—Use Fulguration Electrode No. 20 with as strong and as low a frequency as can be borne by patient.

Cancer—Can be benefited by use of fulguration.
Read Eberhart's Manual.

Catarrh (of nose)—Electrode No. 1. Medium frequency. Apply on outer surface of nose and back of neck. Use No. 4 or No. 15 Electrode internally with high frequency for 2 or 3 minutes. Breathe through ozone generator using nasal tube.

Catarrh (of womb)—Electrode No. 3 or No. 13 preferred. Medium to high frequency. Use in contact with cervix for 3 to 5 minutes every other day.

Cervical Glands (enlargement of)—Daily applications until the glands disappear. lessening length and severity of treatment as they reduce in size.

Cold Extremities—Low frequency and strong spark, but be sure to keep in contact with skin, using No. 1 electrode for 5 minutes, or until a redness is produced on the skin. Repeat daily.

Constipation—Rectal Electrode No. 2 or No. 12. High frequency, strong current. Treat internally for about 5 minutes, repeating daily.

Corneal Opacity—Eye Electrode No. 8. Mild high frequency directly in contact with closed eyelids for 2 to 5 minutes.

Corns—Use No. 30 corn Electrode with strong spark, from 4 to 5 minutes. You can also use Electrode No. 20. Give treatment every other day.

Chilblains—Use No. 1 Electrode, low frequency. Keep in contact with skin for 10 minutes. Treat every other day until cured.

Coryza—Read Nasal Catarrh. Also stroke sides of face with same electrode.

Deafness—Ear Electrode No. 17 is preferred; in the absence of which use point of Electrode No. 6. Use only mild high frequency current for 3 to 5 minutes.

Diabetes—Local application will retard the disease.
Use Mild High Frequency.

Dyspepsia—Electrode No. 1. Medium spark, high frequency. Apply over region of stomach daily for 5 to 8 minutes. After beneficent results are obtained, treat every other day.

Eczema—Use body electrode, preferably covered with gauze. Treat for about 2 or 3 minutes only, using medium frequency.

Eye Diseases—Various forms yield under proper treatment. We recommend Dr. Eberhart's Manual for intelligent use. See page 12.

Freckles—Electrode No. 1 with medium to high frequency. Apply through gauze. Daily treatments of 5 to 9 minutes' duration. Be patient, as results are apt to be slow.

Goitre—Some cases yield to the following treatment: No. 1 Electrode with as strong a current as can be borne without discomfort. Treat through thin gauze or in direct contact with skin daily. Not over 7 minutes' duration.

Gray Hair—Patient treatment for months every other day with Comb Electrode No. 11 will bring pleasing results, the natural color returning.
Read Dr. Eberhart's Book.

Hay Fever—Read Catarrh of Nose and treat similarly.

Headache—When not caused by stomach, apply Electrode No. 1 with medium spark high frequency over forehead, and back over the ears to back of neck. Occasionally down the spine.

Hemorrhoids—Use rectal electrode No. 1 or 12. Use delicate high frequency current. To remove, use fulguration Electrode No. 20.

Hypertension—Auto condensation produces most rapid results. See Arteriosclerosis.

Hypotension—Apply Electrode No. 1 to spine with heavy spark.

Impotence—Use insulated rectal Electrode No. 12 across the genitals with medium to high frequency current, for 4 to 6 minutes.

Inflammations—Use Medium High Frequency from 4 to 6 minutes.

Influenza—Breathing through ozone generator brings immediate relief. Follow with treatment over sides of nose, and in some cases use nasal electrode internally.

Lumbago—Electrode No. 1 with sharp spark over and beyond painful area. Treat every other day for about 6 minutes.

Massage—Electrode No. 1. Medium or low frequency as preferred by patient. The lower the frequency and the sharper the spark, the shorter the time required for treatment. Through heavy gauze is ideal.

Moth Patches or Moles—Fulguration Electrode No. 20 with medium or high frequency. Do not overtreat, as 1 to 2 minutes suffices over a small area.

Nervousness—Treat over spine with medium to high frequency. Daily treatments at first, followed by treatments every three days for about one month.

Neuritis—Surface Electrode No. 1. Heavy current, high frequency. Relief almost instantly. Do not treat over same surface over 5 minutes, but treat twice daily if at all possible. Results are most pleasing, even in chronic cases.

Paralysis—Electrode No. 1 with sharp spark of medium frequency. Apply over muscles in contact and by patting, raising the Electrode about one-quarter to one-half inch above the surface. Treatments should be made daily and be of 4 to 8 minutes' duration.

Prostatic Diseases—Special Electrodes are made for treating diseases of the prostate, but excellent results have been obtained by use of Electrode No. 12, in reducing enlarged prostate.
A mild, medium frequency is used for 5 to 10 minutes.

Pyorrhea Alveolaris—Apply Special Dental Electrode No. 61 to gums for 3 to 5 minutes, using high frequency and in direct contact with the gums.

Rheumatism—Combine treatments as given in Neuritis and Paralysis.

Rodent Ulcer—Best results are obtained with X-ray. Fulguration Point No. 20 has been used to destroy the affected tissue.

Skin Diseases—The Dermatologist will find many uses for the high frequency current due to its cauterizing, escharotic and antiseptic properties. Read any good book on the subject of high frequency or high potential currents.

Sciatica—Body Electrode, medium frequency. Apply for 5 to 7 minutes.

Sore Feet—Use No. 1 Electrode 6 to 8 minutes with strong spark.

Stiff Joints—Apply as for Neuritis with longer treatment if deemed necessary.

Throat Diseases—Use Throat Electrode No. 5 or No. 18 with mild current high frequency. Finish by treating above and below larynx with Electrode No. 33. Duration of treatment about 8 minutes.

Torticollis (Stiff Neck)—Treat back of ear and down back and sides of neck. Use Electrode No. 1 with sharp spark medium frequency, patting the surface gently. Give treatments of 10 minutes or longer.
Treat over closed eyelid for 1 to 3 minutes.

Trachoma—Apply Eye Electrode No. 8 with highest frequency.

Ulcers (Chronic)—Treat through gauze with as sharp a spark as can be tolerated, using Electrode No. 2 or surface No. 1. Ozone generator can be used to advantage by employing the spray.

Uterine Diseases—Use Electrode No. 13 and apply with highest frequency for short periods. Beneficial results are always obtained.

Warts—Use Fulguration point, or in absence of same use Electrode No. 6. Treat with low frequency, using a spark about ⅛ inch long, or sufficiently long to cauterize.

When using Fulguration point let it rest on top of wart and press lever several times, passing spark through deep crustation. One treatment usually is sufficient, but if no results are apparent after 5 days, repeat.

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In the foregoing suggestions we refer to High, Medium and Low frequency currents, as well as to Sharp, Medium and Mild sparks. To make this clear, we add that **Highest** frequency is obtained when plug "E" is pulled up or out. To gradually reduce frequency, turn screw "A" counterclockwise about one-half turn, or until vibrations become noisy. At this point we refer to current as **medium frequency** and it is approximately the same frequency as is generated when screw "A" is turned down close to stop and plug "E" is pressed to bottom. From this point the frequency can be made still lower by repeating the process of turning counterclockwise. The latter point is the **lowest** frequency and is a very powerful current.

Length of spark used in treating can be adjusted by setting point "C" at different distances from ball "D."

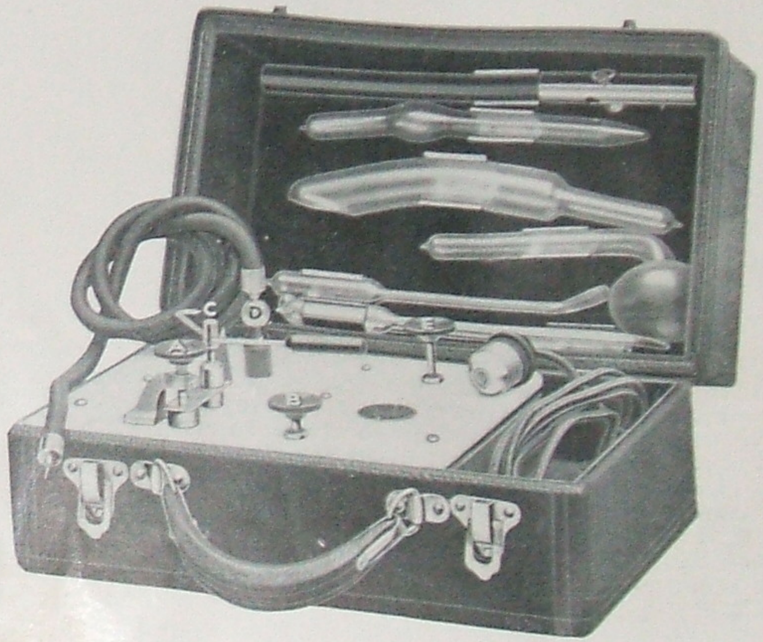
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Note: Ozone generated by Type "F," as well as from any other high frequency outfit, is best applied through the ozone generator, through a solution of oil of pine needles and Eucalyptus.

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Note: All of our cord tips are of the split type and can be spread with a knife blade where too loose. Friction can also be given to spark point "C" by spreading support with knife blade.

DIRECTIONS FOR OPERATING TYPE "F" HIGH FREQUENCY COIL



Attach plug on green cord to socket of 110 volts, Alternating or Direct Current.

Press down button "B." Screw down regulator "A" to stop, then slowly unscrew "A" until a smooth flow of current passes between the point of spark regulator "C" and the ball of active pole "D."

Touch ball "D" with point of "C."

Pull up "B" and attach black cord to handle and to ball "D."

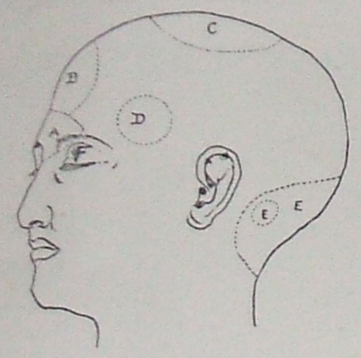
Press down "B" and open point "C" until the desired amount of current passes through the tube.

For delicate treatment, hold hand on tube while making or breaking contact with your patient.

Plug "E" down gives Lowest frequency, but Highest power.

Plug "E" up gives the Highest frequency, but Lowest power.

High Frequency In Eye Treatments



After examining a patient's eyes with the ophthalmoscope or ophthalmometer and before proceeding with the test chart, give patient a one minute treatment on each eye "F" with eyelids closed. Use single or double eye electrode with plug "E" up. Mild current. This treatment is for relaxing the accommodation, poor circulation, and dimness of vision. For asthenopia, headaches and muscular imbalance, treat areas marked A, B, C, D and E about one minute each. Use single eye electrode. If the patient has asthenopia, excellent results are obtained by using large surface electrode up and down the spine and across shoulders for about 3 minutes. From 6 to 10 treatments (one daily) are usually given. For delicate treatments hold your hand over the electrode before making or breaking contact with the surface of the skin.

Do Not Touch Metal Parts While Machine is in Operation

Dr. Eberhart's Manual on high frequency says: "Frontal or congestive headaches are relieved by passing electrode back and forth over seat of pain. Keep the tube in close contact to prolong the treatment until relief takes place which will usually be about 5 minutes." The diagram outlines the areas where headaches occur. This will be useful in suggesting the probable line of treatment. In treating areas A, B, C, D and E, plug "E" can be pushed down.

Dr. Eberhart's Manual on high frequency gives a complete treatise on all eye diseases. Price $4.00.

Sent post paid on receipt of price. It will greatly aid the optometrist in this work.

INDIRECT TREATING

The Glass Handle, No. 53, illustrated on page 15, or our special Metal Handle, made for the same purpose, is to be used for "Indirect" treatments. Connect the Heavy Black Cord into the ring on the end of the No. 53 Handle, other end of cord into Pole "D," and have the patient hold the glass with both hands. The current will then pass into the body, freely, and can be withdrawn by simply touching your fingers to any part of that patient's body. You will find this an excellent way to get at parts which are somewhat awkward to reach with the glass electrodes and that the current discharge will be very mild, but considerable warmth generated.

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To intensify the action of the High Frequency Current as delivered by the regular glass tube, use two cords. Place the tip of one cord into the Neutral Pole "C," the other end to the Glass or Metal Handles, having the patient hold this handle firmly; then apply the electrode as you would for an ordinary High Frequency treatment, connected to Pole "D." This intensifies the current, as Pole "C" is grounded, and the discharge across is somewhat stronger than when using Pole "D," only.

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PRICES

No. 479 Type "F" Portable, with connecting Cord and Plug, ready to attach to any Electric Light Socket.
Code—ABADE $26.50

No. 484 Outfit, same as No. 479, with addition of Cautery Circuit.
Code—ABORAD $29.50

No. 489 Outfit, with Cautery Circuit, same as No. 484, and full set of High Frequency Electrodes as outlined with No. 480.
Code—ABOX $35.00

No. 480 Outfit, consists of "F" Portable No. 479 with addition of:
1 No. 1 Surface High Frequency Electrode,
1 No. 2 Rectal High Frequency Electrode,
1 No. 3 Vaginal High Frequency Electrode,
1 No. 4 Nasal High Frequency Electrode,
1 No. 5 Throat High Frequency Electrode,
1 No. 6 Urethral High Frequency Electrode,
1 No. 50 Insulated Handle,
1 No. 51 Heavy Insulated Cord.
Code—ABBE, complete $32.50

No. 481 Outfit, with Cautery Circuit, full set of 6 Electrodes, Cord and Handle, as outlined with No. 489, and
1 No. 301 Adjustable Cautery Handle,
2 No. 306 Cautery Cords,
1 No. 305A Cautery Knife,
1 No. 305B Cautery Knife,
1 No. 321 Diagnostic Illuminator, with Cords, Holder and Tungsten Lamp,
1 No. 20 Fulguration Handle with 3 Tips.
Code—ABDUCT $43.50

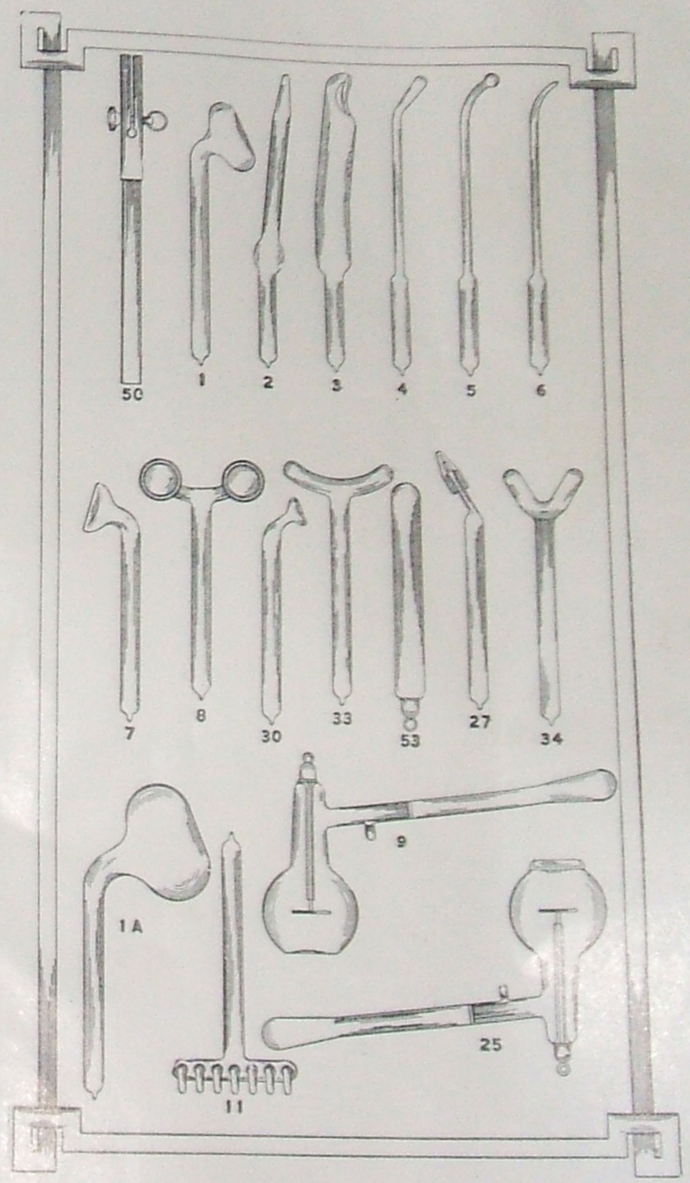
No. 482 Dental Outfit, consists of:
1 No. 479 Portable "F" Generator,
1 No. 01 Surface Electrode,
1 No. 061 Insulated Pyorrhea Electrode,
1 No. 062 Insulated Cocain Electrode,
1 No. 063 Insulated Cavity Electrode,
1 No. 064 Insulated Outer Gum Electrode,
1 No. 049 Insulated Rubber Shock Proof Handle, with Heavy Protected Cord Attached.
Code—ABIES $35.00

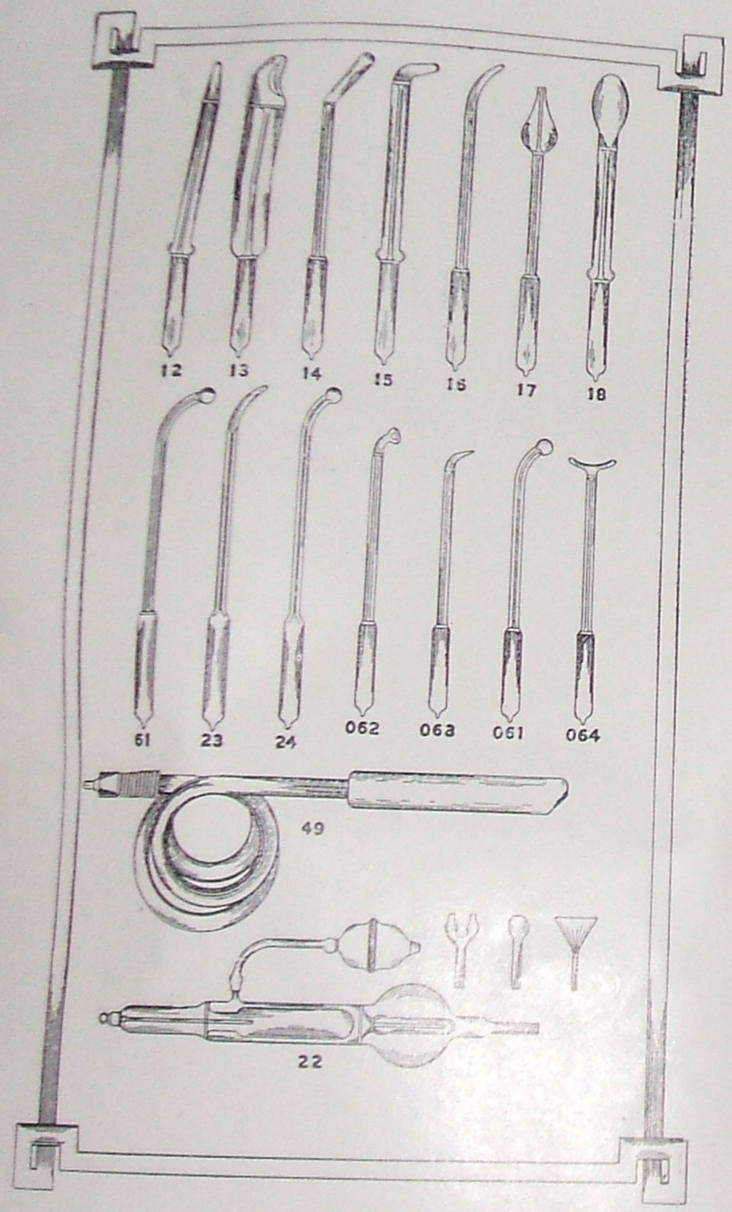
No. 483 Chiropodists' Outfit, consists of:
1 No. 479 Portable "F" Generator,
1 No. 1 Surface High Frequency Electrode,
1 No. 7 Bunion High Frequency Electrode,
1 No. 20 Fulguration Handle and 3 Tips,
1 No. 30 Corn High Frequency Electrode,
1 No. 50 Insulated Handle,
1 No. 51 Heavy Insulated Cord.
Code—ABLATE $32.50

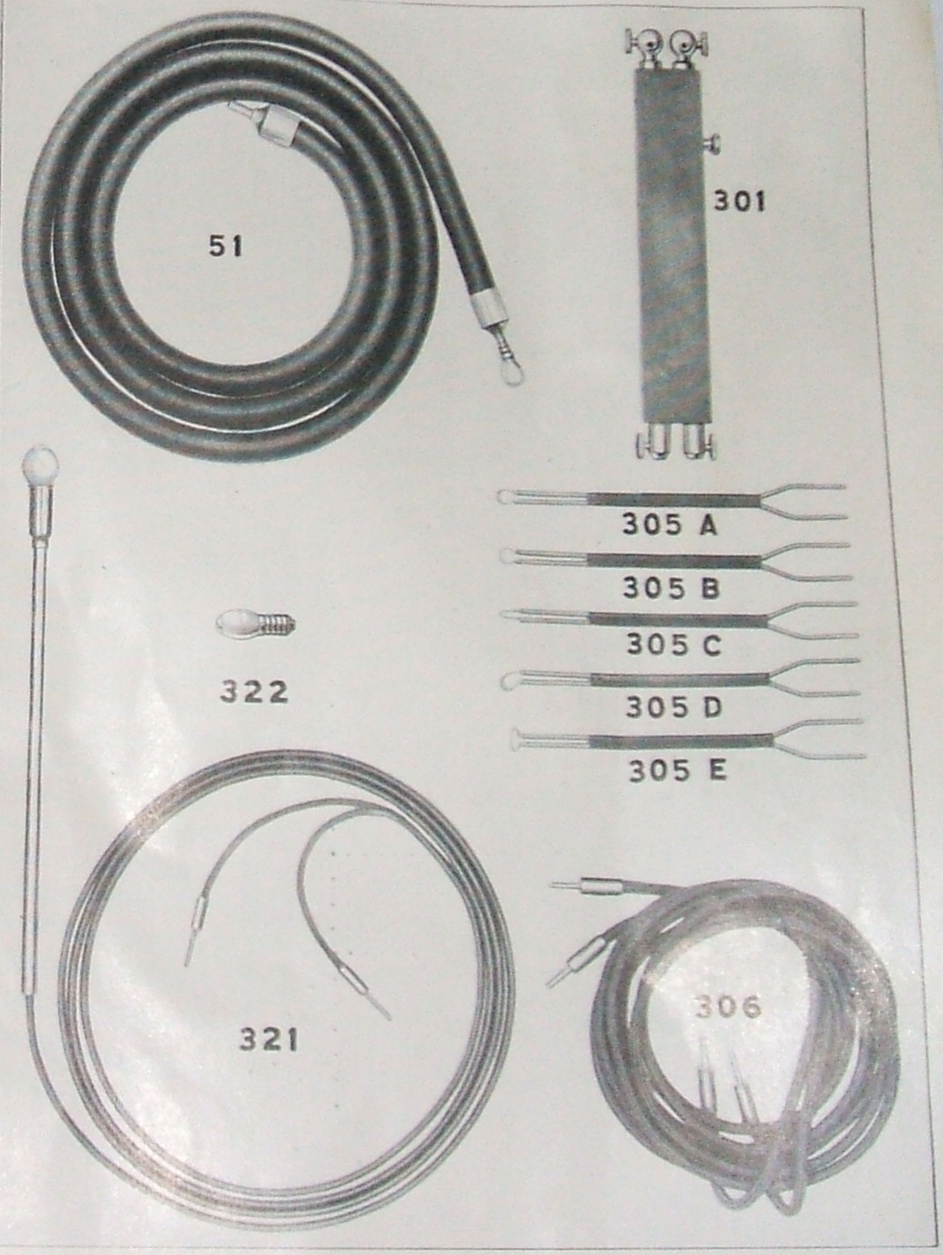
A Type "F" instruction Booklet is included in all of these outfits.

The following pages contain illustrations and prices of accessories that can be used with Type "F" Generator. They are all kept in stock and your order can be filled the same day we receive it.

We operate our own Glass Blowing Department and can furnish any other electrode desired, or we will make any special design from your blue print or sketch.




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305 A
305 B
305 C
305 D
305 E
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Price List of Electrodes and Accessories

No.	Description	Code	Price
1	—Surface —Plain	Bacca	$ .75
2	—Rectal —Plain	Bagot	.75
3	—Vaginal —Plain	Ballet	.85
4	—Nasal —Plain	Balm	.75
5	—Throat —Plain	Baric	.75
6	—Urethral —Plain	Bark	.75
7	—Eye, Single —Plain	Barley	.75
8	—Eye, Double —Plain	Basal	1.25
9	—Metal Disc Body	Basic	3.75
11	—Comb (Scalp)	Batia	2.00
12	—Rectal —Insulated	Bazin	1.60
13	—Vaginal —Insulated	Beat	1.85
14	—Nasal —Insulated	Bed	1.60
15	—Post Nasal—Insulated	Beef	1.60
16	—Urethral —Insulated	Bela	1.60
17	—Inner Ear —Insulated	Belt	1.60
18	—Tongue —Insulated	Benzol	2.00
20	—Fulguration	Gadol	2.00
21	—Ozone Generator, only	Bidet	7.50
22	—Ozone Generator, complete	Bidwy	10.00
23	—Special Heavy Glass Urethral	Gull	1.00
24	—Special Heavy Glass Throat	Gum	1.00
25	—Cataphoresis	Binder	4.50
27	—Glass Fulguration	Guad	1.75
30	—Corn	Biogen	.75
33	—Outer Throat	Biotic	.75
34	—Spinal	Bite	.85
49	—Insulated Rubber Handle and Cord, ⅝"	Block	3.75
50	—Universal Handle, ⅝"	Bolus	1.00
53	—Glass Handle for Indirect Treating	Bismal	1.25
54	—Handle to Fit No. 49	Banter	1.00
61	—Throat—Insulated	Breath	1.50
62	—Insulated Dental Cocain	Bridge	1.50
63	—Insulated Dental Cavity	Bridle	1.50
64	—Insulated Dental Outer Gum	Brim	1.50
51	—Heavy Cord, 4' long	Gait	1.25
51-5	—Heavy Cord, 5' long	Hirtz	1.40
51-6	—Heavy Cord, 6' long	Hoche	1.55
51-7	—Heavy Cord, 7' long	Hodge	1.70
52	—Metal handle for indirect treatments, extra long	Carota	1.00

Electrodes and Accessories Continued

301	Cautery handle, adjustable to 5 positions	Acetyl	2.25
305	Cautery Knives, any shape	Acmea	.85
306	Cautery Cords, per pair	Achor	1.00
321	Diagnostic illuminator with cords, holder and Tungsten lamp	Analog	2.00

Portable Electo-Therapeutic Outfit Type "K"



This Apparatus Covered by Physicians Electrical Appliance Controls Patent No. 1260354

Here is a powerful, simple, practical and durable outfit, especially designed to fill the needs and meet the requirements of the physician who appreciates the value of the various modalities and recognizes that it is essential to have them available, but yet who does not wish to install one of the heavier cabinets, or wants a portable to supplement his office equipment.

Type "K" will be found to meet all requirements for such practice, and we can unconditionally recommend it to the profession as a high-class, dependable and economical piece of professional equipment.

For Fulguration The operator has the option of using the short Hot Sparks, or the longer Thin Sparks, which Desiccate but do not Cauterize.

Ozone By means of one of our small generating and filtering inhalers.

D'Arsonval For auto Condensation, in connection with the chair pad furnished, in gradual steps up to 650 Milliamperes. The exact amount of current being delivered to the patient can readily be ascertained by means of our Color Scale; also furnished.

Cautery Enough energy to properly heat any ordinary knife, of any manufacture. **Finely controlled.**

Diagnostic Any Voltage, from one-half to twelve, regulated accurately, can be used for illuminating your smallest cystoscope bulbs with perfect safety.

Sinusoidal with a wide range of regulation.

CONSTRUCTION

The case measures, when closed, 17 inches in length, 11 inches in depth and 8½ inches in height as it stands. It is very substantially built, being steel bound and covered with a good quality of black leatherette, which will outwear leather. The interior is lined with velvet. All the metal parts are made of brass, heavily nickel-plated, and are mounted on white Italian marble. Metal clips are mounted on the inside of the cover in such a way that there is abundant room for all the accessories which go with the outfit, as mentioned on the following page.

Portable Combination Type "K"

Furnished Complete as Follows

1		Type "K" with Connecting Cord and Plug.
1	No. 1	Surface High Frequency Electrode.
1	No. 2	Rectal High Frequency Electrode.
1	No. 3	Vaginal High Frequency Electrode.
1	No. 4	Nasal High Frequency Electrode.
1	No. 5	Throat High Frequency Electrode.
1	No. 23	Urethral High Frequency Electrode.
1	No. 50	Handle for High Frequency Electrode.
1	No. 51	Heavy Insulated High Frequency Cord.
1	No. 410	Auto Condensation Pad.
1	No. 411	Regulating Lamp and Clamp.
1	No. 412	Color Scale.
1	No. 52	D'Arsonval Handle.
2	No. 311	Sinusoidal Cords.
2	No. 312	Sinusoidal Handles.
1	No. 316	Spongio Handle and Disc.
1	No. 614	Hand Diathermy Electrode.
1	No. 321	Diagnostic Illuminator with Cord.
1	No. 322	Tungsten Lamp.
1	No. 301	Cautery Handle, Adjustable.
1	No. 305A	Cautery Knife.
1	No. 305B	Cautery Knife.
2	No. 306	Cautery Cords.
1	No. 20	Fulguration Electrode.
	3	Tips for Fulguration Electrode.
1		Booklet Instructions.

Arranged to operate on the 110-Volt, 60-Cycle, Alternating Current.

No.	Code	Price
Outfit 485T, with improved Tungsten Spark Interrupter Points	Ante	110.00

We Also Manufacture and Carry in Stock a Complete Line of ELECTRO THERAPEUTIC APPARATUS Which Includes the Following:

X-Ray Transformers
Auto Condensation Treatment Outfits
Auto Condensation Pads
Thompson-Plaster Electrical Cabinets
Diathermic Treatment Outfits
X-Ray Plates and Equipment
High Frequency Outfits
Portable X-Ray Generators
Diagnostic Light Regulators
Dental High Frequency Outfits
Portable Combination Outfits
Cautery Transformers
Cautery Equipment
Therapeutic Lamps
Dental X-Ray Equipment

Ask Your Nearest Dealer. If He Will Not Supply You, Send Your Order Direct

F

Whether Intelligence rules
all things or chance rules,
Man must use the power
that he has and
be Tranquil

Fischer
CHICAGO, ILL.

FISCHER

Portable High Frequency Apparatus



CATALOG No. 12

Portable High Frequency Apparatus

Notice—Illustrations herewith are not binding as to detail, in view of constant improvements, and the goods supplied on your order may differ slightly in appearance. However, when your order is received, the very latest model is forwarded. Our full line of accessories, for use with the following apparatus, is covered in our special accessory catalogue No. 11.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

OCTOBER, 1922

Manufactured by

H. G. FISCHER & CO., INC.

2333-43 Wabansia Avenue

CHICAGO, ILL.



No. 485T—Portable Combination Type "K"

This apparatus covered by Physicians' Electrical Appliance Controls
Patent No. 1260354

A Compact, Practical, Portable Electro-Therapeutic Outfit—Type "K"

There are a great many circumstances under which the ordinary practitioner does not need a large and heavy cabinet for his electro-therapeutic work, and there are other occasions when a portable outfit is urgently required.

Here is a powerful, simple, practical and durable outfit, especially designed to fill the needs and meet the requirements of the physician who appreciates the value of the various modalities and recognizes that it is essential to have them



Indirect High Frequency Application—Electrode on Tonsil

available, but yet who does not wish to install one of the heavier cabinets or wants a portable to supplement his office equipment.

Type "K" will be found to meet all requirements for such practice, and we can unconditionally recommend it to the profession as a high class, dependable and economical piece of professional equipment.

High Frequency—*Type* "K" has a range of from zero to 70,000 volts potential, under excellent control, for use with glass high frequency tubes.

The primary effects of High Frequency applications are noted in increased blood supply to a given area, increased oxidization, secretions and local nutrition. They are locally germicidal, and while mild or medium sparks are stimulating, *strong* spark discharges are caustic in effect.

High Frequency currents and the Vacuum Tube treatments are indicated generally in infectious skin diseases, and superficial conditions, as well as internal infections that can be reached with electrodes.



Application d'Arsonval Current to Chest

Auto-Condensation—The d'Arsonval, auto-condensation current is delivered by the Type "K," through *the chair pad furnished*, in even, gradual steps up to 800 milliamperes. No sensation of electrical current is perceptible by the patient.

The Auto-condensation current is used, in the majority of cases, for the treatment of high blood pressure. These currents are soothing to the entire system, and the effect of application constitutes what may correctly be termed a cellular massage.

Diathermy may be defined as a form of High Frequency d'Arsonval current, of Thermo-Therapy which utilizes electrical energy for the production of thermal (heat) effects in the depths of the tissues.

We all know the therapeutic value of heat. Poultices (linseed and bread) and the hot water bottle have been used since time immemorial, but before the advent of the "Diathermy" application all bodily heat (with the exception of that generated by the combustion of food) had to be applied from the outside; the outer shell received more than its share of the heat application while the internal areas were practically untouched.

When applying Diathermy, however, the desired heat may be directed to precisely the area you wish to cover, the intensity of the application may be easily modified to suit the individual case, the patient feels no "electrical sensations," and the entire treatment consists of generating just that amount of heat at the focal point necessary regardless of how deep in the tissues that point may be.

Diathermy current up to 1000 milliamperes is obtainable from the Type "K" Portable, at an extremely high rate of frequency; and effective, result producing discharge.

Fulguration—One of the most valuable and useful of all the many modern adaptations or applications of the High Frequency current.

Fulguration current may be applied in two distinct forms: the long cool sparks, which desiccate but do not ordinarily cauterize, and the short, hot sparks used for Electro-coagulation The former are taken from the high voltage, low amperage discharge of the Tesla coil proper, and the latter from the d'Arsonval windings. Both forms are available from the Type "K."

Tesla Fulguration is especially useful in superficial skin treatments such as warts, moles, etc., and the d'Arsonval type

for orificial work such as destruction of papilloma of the bladder. There apparently is no limit to the actual usefulness of this modality.



Indirect Fulguration

Ozone—One of the many uses of High Frequency current is as a blood purifier, through the agency of Ozone. Ozone is generated by the type "K" by the electric spark, or spray, and when applying the glass vacuum electrodes this agent seeks the path of least resistance (which in the body is the veins, as they contain the conductible carbonates and impurities), which are mostly in need of this purifying action.

Purified ozone is indicated in infectious diseases, anemia, diseases of the respiratory organs, as well as all conditions where there is imperfect oxidation and impaired nutrition. Ozone spray is invaluable in the treatment of ulcers.

Cautery—Type "K" generates a sufficient quantity of this universally handy modality to properly heat any ordinary knife, of any manufacture; perfectly safe, easy to handle, and with 60 points of control.

Every physician knows the uses of the Electric Cautery, hence no technical description should be necessary.

Diagnostic Lamp—The low potential current available for the lighting of diagnostic lamp bulbs can be regulated accurately to deliver from ½ to 12 volts. Anything from your smallest cystoscope bulbs up to good sized lamps within the voltage limit can be operated safely.

Among the most valuable uses of the diagnostic lamps may be cited: examination of the bladder for papilloma or stones, intra oral, intra nasal, and general sinus investigation.



Application Sinusoidal

Sinusoidal—The ideal electrical muscle massage, effective yet painless, the best known uses of which are for the treatment of Paralysis and habitual Constipation, and we have some very favorable reports on the treatment of deafness as well.

The application is very simple, and a very small assortment of electrodes may be used for a number of distinctly different cases.

The Sinusoidal current as generated by Type "K" is adaptable to any method of application, is under perfect control, and with a potential range of from 5 to 45 volts.

Construction—Type "K" Portable was originally designed with the idea ever in mind that as much efficiency should be built into as small and compact form as was possible with safety and good electrical engineering. We are justly proud of the result, and have scores of pleasant letters in our files to clearly testify, even to the most skeptical, that we have a really wonderful result producing appliance in Type "K".

We use a closed core step-up transformer; mica plate condenser; tungsten spark interrupter points; a combination of the d'Arsonval and Tesla coils giving the operator the advantage of either high voltage and low amperage, or high amperage and low voltage, with a sliding scale between, and at various frequencies.

The *Spark Interrupter Points* on the Type "K" apparatus are really a splendid feature. Ordinarily the intense heat generated by the passing of the current across these points cause sufficient pitting and corrosion as to become rather a nuisance during long treatments. This trouble has been done away with entirely on the Type "K."

The case measures, when closed, 17 inches in length, 11 inches in depth, and 8½ inches high. It is steel bound, made of solid kiln dried stock, and covered with high quality black leatherette. The interior is velvet lined and so padded that when the nickel plated electrode clips are fastened in place and the glass tubes slipped in, the appearance is very pleasing.

The electrical top itself is white Italian marble, on which are mounted the necessary outlets and control levers of brass, heavily nickel plated.

Guarantee—With the apparatus, when shipped, we send a very liberal guarantee. See page 27.

Catalog No. 485T—Type "K" Portable Combination Outfit with connecting cord and plug ready to attach to the 110 volt, 60 cycle A. C. line, with *Tungsten Spark Points*, with addition of:

1 No. 1 Surface High Frequency Electrode.
1 No. 2 Rectal High Frequency Electrode.
1 No. 3 Vaginal High Frequency Electrode.
1 No. 4 Nasal High Frequency Electrode.
1 No. 5 Throat High Frequency Electrode.
1 No. 20 Fulguration Electrode with 3 tips.
1 No. 23 Urethral High Frequency Electrode.
1 No. 50 Handle for High Frequency Tubes.
1 No. 51 Heavy Insulated High Frequency Cord.
1 No. 52 Auto-Condensation Handle.
1 No. 301 Adjustable Cautery Handle.
1 No. 305A Cautery Knife.
1 No. 305C Cautery Knife.
2 No. 306 Cautery Cords.
2 No. 311 Metal Sinusoidal Handles.
2 No. 312 Maroon Sinusoidal Cords.
1 No. 316 Felt Sinusoidal Disc and Handle.
1 No. 321 Diagnostic Illuminator (cords, holder and lamp).
1 No. 322 Diagnostic Lamp Bulb (extra).
1 No. 410 Auto-Condensation Chair Pad and Cord.
1 No. 411 Auto-Condensation Registering Lamp and Holder.
1 No. 412 Color Scale for d'Arsonval Currents.
1 No. 614 Hand Diathermy Electrode.
1 Book of Instructions.

Code, ANTE. Price $110.00.

Catalog No. 486T — Type "K" Portable Combination Outfit, with *no accessories,* with connecting cord and plug ready to connect to the Alternating Current line of 110 volts, 60 cycles, with *Tungsten Spark Points.*
Code, ABOSET. $80.00.

Where Alternating Current other than the regular 110 Volts, 60 Cycles, is to be used to operate the Type "K," the following alterations in price will apply:

For 100 Volts, **25** Cycles, add $5.00.
For 110 Volts, **40** Cycles, add 5.00.
For 220 Volts, **25** Cycles, add 6.50.
For 220 Volts, **40** Cycles, add 6.50.
For 220 Volts, **60** Cycles, add 5.00.

When the Direct Current only is obtainable a Rotary Converter to transform this direct flow into the necessary Alternating current of 110 Volts, 60 Cycles, must be employed. The Type "K" itself need not be altered, as whether you use 220 Volts or 110 Volts Direct Current the rotary furnished delivers exactly 110 Volts A. C.

No. 950X—Rotary Converter, for use when operating Type "K" on 110 Volts Direct Current. Code, EMOLO. $55.00.

No. 955X—Rotary Converter, for use when operating Type "K" on 220 Volts Direct Current. Code, EPUL. $57.50.

Shipping Weights and Measures covering No. 485T

Net Weight in Lbs.	Net Weight in Kilos	Gross Weight in Lbs.	Gross Weight in Kilos	Dimen. of Containers in Inches	Dimen. of Containers Centimeters	Description of Contents of Containers
35	15.7	66	29.7	13x16x23	33x40x48	Box Cabinet

Type "K" No. 486T weighs 11 lbs. *less* than No. 485T.

The Type "D" Portable High Frequency Generator

A High Frequency generator of the transformer type, light in weight, yet sufficiently powerful for all ordinary applications of this very valuable electrical modality.

Type "D" is economical and dependable, and was designed to meet the demand *for a medium* priced Portable outfit. It is simple to operate, neat in appearance, complete in itself, sturdily constructed and absolutely noiseless in operation.

The electrical modalities available are a powerful High Frequency discharge for use with the glass vacuum electrodes and for the production of Ozone, and Fulguration. There are five points of voltage (spark length) *control*, and a variable condenser permitting the use of a very highly oscillating discharge for cavity work, as well as the lower frequency, heavier discharge for general massage.

The *High Frequency* currents, as applied by means of the glass tubes are most generally indicated in infectious skin diseases, and such internal infections as can be reached *with the* electrodes. High Frequency currents are locally germicidal, and while strong spark discharges are caustic in effect, mild or medium sparks are stimulating.

Type "D" portable, being of the step-up transformer type of construction, *can only* be operated from an alternating current source, preferably 110 Volts, 60 Cycles. Care should be exercised when ordering that the type of current as well as the number of cycles is understood, and that we are notified accordingly. When Direct Current must be used a Rotary Converter is necessary to generate the required 60 Cycle Alternating. (See price list, page 16.)

The case measures 8½x11x17 inches, strongly made, bound with a steel valence and covered with a high grade of leatherette which offers greater wearing qualities than leather. The interior of the cover is so lined with velvet, padded, and arranged with metal clips to hold the various glass tubes in place that the entire assembly *is very* neat and attractive.

All the exposed metal parts, levers, switch, etc., are made of brass or copper, heavily nickel plated, and mounted on white Italian marble.

The glass vacuum electrodes are built here in our own factory of the best grade glass, carefully annealed, and uniformly exhausted.

Type "D" Portable is thoroughly tested before it leaves the factory, and with normal care should last a number of years. Each apparatus shipped is accompanied with our regular guarantee, details of which will be found on page 27.

Catalog No. 693—Type "D" portable with *no accessories*, but including connecting cord and plug ready to connect to the 110-Volt, 60-Cycle A. C. line.

Code, LATISH. Price $54.00.

Catalog No. 695—Type "D" portable, with connecting cord and plug ready to connect to the 110-Volt, 60-Cycle line, with addition of:

1 No. 1 Surface. High Frequency Electrode,
1 No. 7 Concave Surface Electrode, small.
1 No. 9D Body Condenser Electrode.
1 No. 11 Comb Electrode.
1 No. 27 Fulguration Electrode.
1 No. 33 Throat Electrode.
1 No. 49 Rubber Insulated Handle and Cord.
1 No. 51 Insulated High Frequency Cord.
1 Complete Booklet of Instructions.

Code, LATENT. Price $65.00.



No. 695 —Type "D" Portable Outfit



No. 696—Type "D" Portable Outfit

Type "D"
With Cautery and Diagnostic Circuits

Cautery Knives and Electric lighted Diagnostic Instruments are used so generally by the average physician that we have built up a special portable "D" with these modalities. This equipment has sufficient Cautery output to heat all ordinary medium sized knives, and a range of from 2 to 12 volts for diagnostic purposes.

Both these currents are under perfect control, and a set of accessories for their proper application are included in the equipment. The High Frequency and Fulguration currents are the same as delivered from the regular Type "D."

Catalog No. 694—Type "D" Portable, with the Cautery and Diagnostic windings, but *no accessories*, with connecting cord and plug ready to connect to the 110-Volt, 60-Cycle A. C. line.

Code, LATIUM. Price $60.00.

Catalog No. 696—Type "D" Portable, with the Cautery and Diagnostic circuits, with connecting cord and plug ready to connect to the A. C. 110-Volt, 60-Cycle line, with addition of:

1 No. 1 Surface High Frequency Electrode.
1 No. 7 Small Concave Surface Electrode.
1 No. 11 Comb High Frequency Electrode.
1 No. 27 Glass Fulguration Electrode.
1 No. 33 Outer Throat Electrode.
1 No. 49 Rubber High Frequency Handle and Cord.
1 No. 54 Glass High Frequency Handle.
1 No. 301 Cautery Handle, adjustable.
2 No. 305 Cautery Knives.
2 No. 306 Cautery Cords.
1 No. 321 Diagnostic Illuminator.
1 Complete Booklet of Instructions.

Code, LATIN. Price $75.00.

Shipping Weights and Measures of No. 693

Net Weight in Lbs.	Net Weight in Kilos	Gross Weight in Lbs.	Gross Weight in Kilos	Dimen. of Containers in Inches	Dimen. of Containers Centimeters	Description of *Contents* of Containers
25	11	48	21	13x16x23	33x40x48	Box Cabinet

Type "D" No. 695 weighs 2 lbs. more than No. 693.

Where Alternating Current other than the regular 110-Volt, 60 Cycles is to be used to operate the Type "D," the following alterations in prices will apply:

For *110 Volts*, **25** Cycles, add $5.00.
For 110 Volts, **40** Cycles, add 5.00.
For 220 Volts, **25** Cycles, add 6.50.
For 220 Volts, **40** Cycles, add 6.50.
For 220 Volts, **60** Cycles, add 5.00.

Where the Direct Current only is available a Rotary Converter to transform this direct flow into the necessary *110-Volt*, 60-Cycle Alternating must be added. When you order an apparatus for 110 D. C. we send a Rotary to deliver the same voltage at 60 Cycles alternating, our No. 950X; and for operation on the 220-Volt D. C. line we furnish our No. 955X, which also *delivers* 110 Volts. In either instance the regular Type "D" can be used in connection with the proper rotary.

No. 950X—Rotary Converter, for operation on the 110-Volt D. C. line. Code EMOLO. $55.00.

No. 955X—Rotary Converter, for operation on the 220-Volt *D. C. line.* Code, EPUL. $57.50.

For Shipping Weights and Measures see preceding page; add *one pound* to No. 693 for No. 694, and *three pounds* for No. 696.

Rotary Converter weighs approximately 25 lbs.

The Type "F" Portable High Frequency and Violet Ray Generator

A practical, durable, yet simple portable high frequency generator, of the magnet coil type, which can be operated with almost equal efficiency on either the alternating or direct current.

Power and Capacity—Type "F" has a capacity of 60,000 volts and can be adjusted down to zero potential.

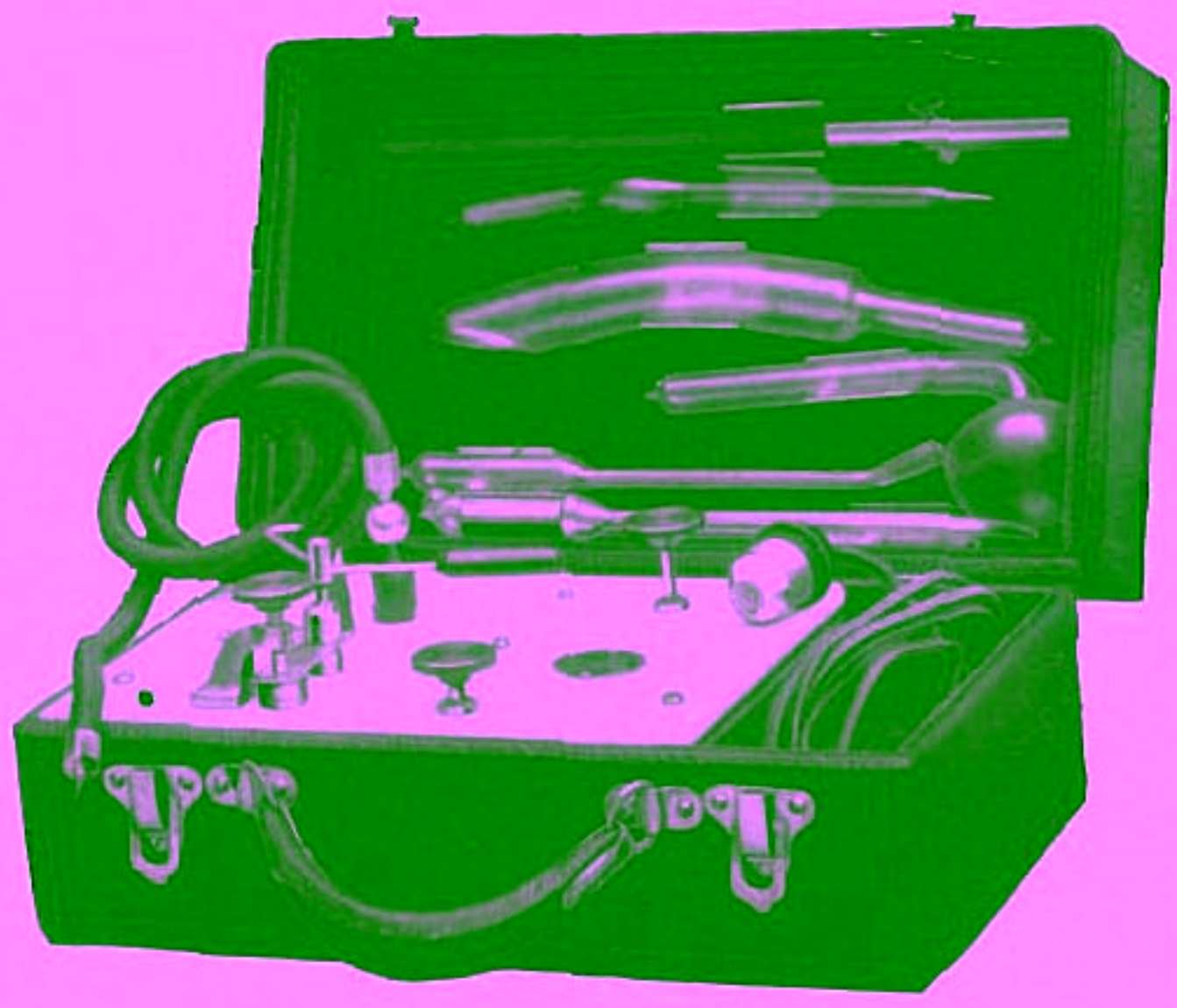
Frequency Control—Type "F" has a frequency controlling device, permitting applications ranging from the heaviest necessary medium frequency currents for massage to the extremely high oscillation required for fulguration or urethral applications.

Portability—Type "F" can be instantly connected to any lamp socket, either D. C. or A. C. Connecting cord is permanently attached. Pocket is provided for all cords. Clamps are provided for tubes and handle.

Metal Parts—All working parts are substantial and are mounted on Italian marble.

Spark Points—The greatest drawback, heretofore, to this type of High Frequency apparatus has been the inability of the operator to set the Spark Interrupter Points to deliver just exactly the required amount of current through the electrode and to have that desired discharge remain constant throughout the treatment, simply because the points themselves were of Silver, which, being soft, would become pitted and corroded from the intense heat and the current passing would fluctuate and gradually diminish.

The Type "F" of today is equipped with interrupter points of Tungsten—a practically unburnable metal—and when once properly adjusted need not be altered unless more or less current is desired.



No. 480—Type "F" High Frequency Portable

Carrying Case—The case is substantially built, being bound with a steel valence and covered with a patented black leatherette which is superior to leather for wear. All trimmings are of brass heavily nickel-plated. The interior of case is lined with velvet.

Guarantee—Every type "F" is put to a severe test before leaving the factory and is backed by our regular guarantee—see page 27.

Electrodes—All electrodes are of large capacity, are annealed, and exhausted to a uniform degree of vacuum.

Not a Toy—Type "F" is a thorough, practical result-producing appliance, and is not a toy that is hung from your lamp socket.

Type "F" will improve your office equipment and will assist you in getting desired results for your patients.

Therapeutic Effects of High Frequency Currents—Locally they relieve congestion and stasis, all local pains and soreness being alleviated. Although this current is applied to *the skin*, the potential is so high that it penetrates every cell in the entire body, reducing hypertension, and by increasing functional activity it accelerates elimination.

We have recently added a new feature to this already very efficient machine, in the way of cautery attachment. This circuit will heat to any *desired* temperature the knives which we furnish, and can also be utilized to light the tungsten diagnostic set supplied by us.

Type "F" can be operated on either Alternating or Direct Current; all that is necessary in ordering is to state the voltage of your supply, and if Alternating, the cycle.

Prices

No. 479, Type "F" Portable, with connecting cord and plug, ready to attach to any electric light socket.

Code, ABADE. Price $26.50.

No. 484 Outfit, same as No. 479, with addition of cautery circuit.

Code, ABORAD. Price, $29.50.

No. 480 Outfit consists of "F" Portable No. 479, with addition of—

1 No. 1 Surface high frequency electrode.
1 No. 2 Rectal high frequency electrode.
1 No. 3 Vaginal high frequency electrode.
1 No. 4 Nasal high frequency electrode.
1 No. 5 Throat high frequency electrode.
1 No. 6 Urethral high frequency electrode.
1 No. 50 Insulated handle.
1 No. 51 Heavy insulated cord.

Code, ABBE. Price, complete, $32.50.

No. 481 Outfit, with cautery circuit, full set of 6 electrodes, cord and handle as outlined with No. 480, and

1 No. 301 Adjustable cautery handle.
2 No. 306 Cautery cords.
1 No. 305A Cautery knife.
1 No. 305B Cautery knife.
1 No. 321 Diagnostic illuminator, with cords, holder and tungsten lamp.
1 No. 20 Fulguration handle with 3 tips.

Code, ABDUCT. Price, $43.50.

No. 482 Dental Outfit consists of—

1 No. 479 Portable "F" generator.
1 No. 01 Surface electrode.
1 No. 061 Insulated pyorrhea electrode.
1 No. 062 Insulated cocain electrode.
1 No. 063 Insulated cavity electrode.
1 No. 064 Insulated outer gum electrode.
1 No. 049 Insulated rubber shock proof handle, with heavy protected cord attached.

Code, ABIES. Price, $35.00.

No. 483 Chiropodists' Outfit consists of—

1 No. 479 Portable "F" generator.
1 No. 1 Surface high frequency electrode.
1 No. 7 Bunion high frequency electrode.
1 No. 20 Fulguration handle and 3 tips.
1 No. 30 Corn high frequency electrode.
1 No. 50 Insulated handle.
1 No. 51 Heavy insulated cord.

Code, ADLATE. Price, $32.50.

No. 489 Outfit, with cautery circuit same as No. 484, and full set of high frequency electrodes as outlined with No. 480.

Code, ABOX. Price, $35.00.

Shipping Weights and Measures Type "F" High Frequency Portable

Net Weight in Lbs.	Net Weight in Kilos	Gross Weight in Lbs.	Gross Weight in Kilos	Dimen. of Containers in Inches	Dimen. of Containers Centimeters	Description of Contents of Containers
13	5.8	15	6.7	7x9x13	17x22x33	P. B. Carton

A type "F" instruction booklet is included in all of these outfits.

The Type "O" Portable High Frequency and Violet Ray Generator

This equipment is constructed along the same lines as the type "F" on the foregoing pages, except that the marble top and controls are mounted on an attractive mahogany box in place of the black leather covered case. Designed more as a permanent fixture than as a portable.

On account of the very simple construction of this apparatus, very little attention is necessary to keep it in perfect *running* condition. It is well made, fully guaranteed against any inherent defects.

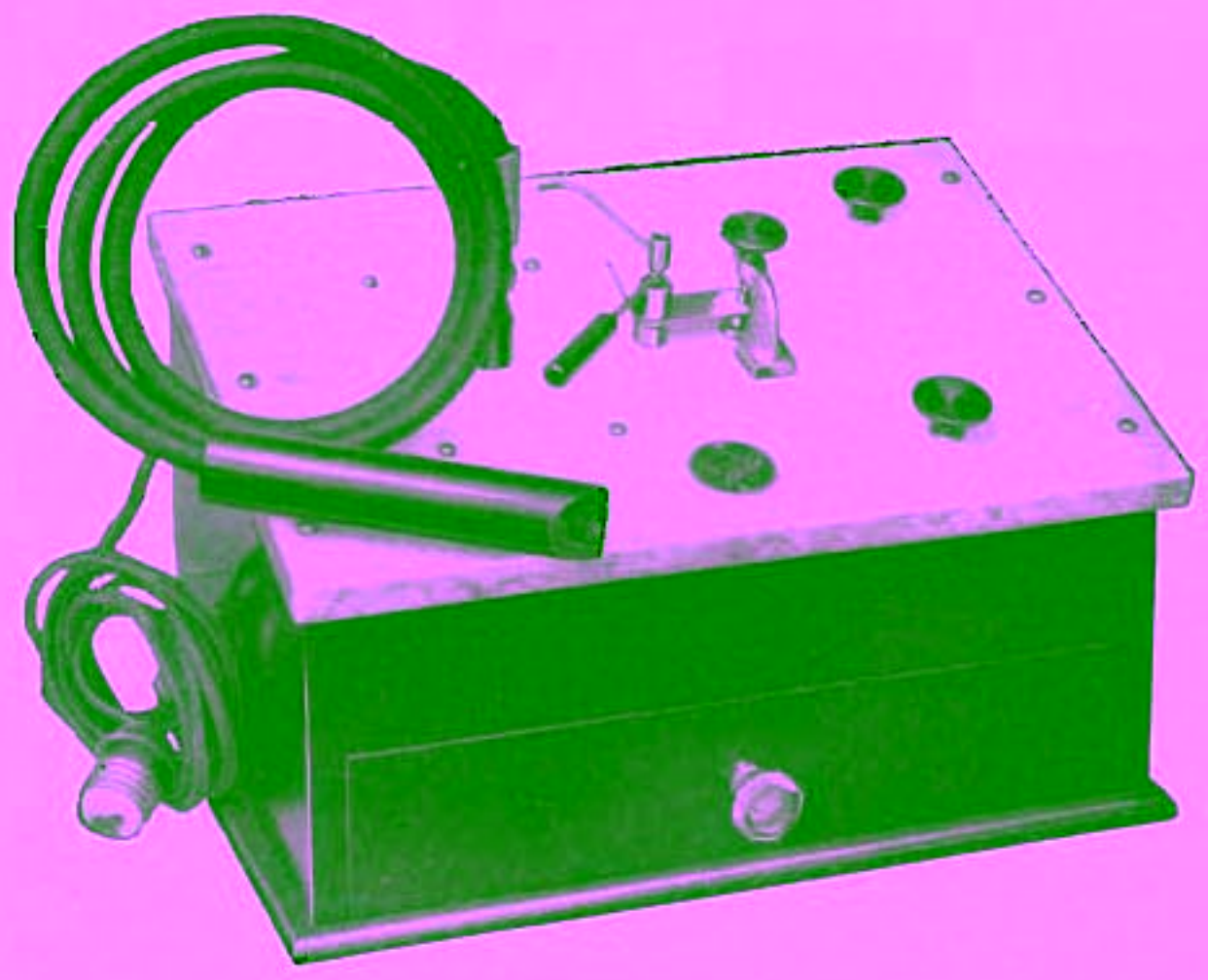
Type "O" can be connected to any *lamp socket*, and to either alternating or direct current. Simply state which current you have available, and the voltage or cycle, and we will adjust the outfit accordingly.

Type "O" has a frequency (oscillation) controlling device, enabling the operator to deliver the powerful, slowly vibrating current for massage, or the very fine, extremely high frequency for *fulguration, or treatment* over tender areas.

Every machine must stand a very severe test before leaving the factory, and the guarantee covers any inherent defect that may develop for a period of two years. The box is finished in mahogany, hand rubbed, and with white Italian marble top, making a handsome combination. All metal parts are of brass, heavily nickel-plated.

A plush lined drawer is provided *with* clips for glass high frequency electrodes, with heavily insulated high frequency cord and hard rubber shock proof handle. The electrodes supplied include:

1 No. 1 Surface tube for general massage.
1 No. 11 Hair comb electrode.
1 No. 49 Insulated rubber shock proof handle.
1 No. 51 Heavy insulated high frequency cord.
1 No. 20 Special fulguration electrode, with 3 tips, for the removal of warts, moles and other nevi.



No. 476—Violet Ray Generator Type "O"

Other high frequency electrodes may be selected from our list, but the above will be found sufficient to cover all ordinary needs.

Outfit No. 476, including Electrodes Nos. 1, 11, 20, Handle No. 49, and No. 51 Cord and booklet of instructions.

Code, ANON. Price, $40.00.

No. 476—Type "O" Portable

Net Weight in Lbs.	Net Weight in Kilos	Gross Weight in Lbs.	Gross Weight in Kilos	Dimen. of Containers in Inches	Dimen. of Containers Centimeters	Description of Contents of Containers
15	6.7	17	7.6	7x9x13	17x22x23	P. B. Carton

The Type "J" Portable High Frequency and Violet Ray Generator

A magnet type high frequency apparatus of a smaller size, but retaining all the characteristics which have made our type "F" so popular.

In general construction Type "J" is very substantial. The case is steel bound covered with black leatherette, and has the interior lined with velvet. All the metal parts are made of brass heavily nickel-plated and mounted on white Italian marble.

Type "J" can be operated from either Alternating or Direct Current; all that is necessary to state when ordering is the voltage of your supply, and if Alternating, the cycles. This information can be had from your local electric supply station

Prices

No. 475—Type "J," complete with surface electrode, 4-foot cord, insulated handle and instruction booklet.

Code, ABANET. Price, $20.50.

No. 473—Type "J," with No. 049 special insulated rubber shock proof handle, with a 4-foot heavy cord attached in place of the regular cord and handle.

Code, ARABIC. Price, $21.00.

Shipping Weights and Measures for No. 475—Type "J" Portable

Net Weight in Lbs.	Net Weight in Kilos	Gross Weight in Lbs.	Gross Weight in Kilos	Dimen. of Containers in Inches	Dimen. of Containers Centimeters	Description of Contents of Containers
7	3.1	10	4.5	8x8x12	20x20x30	P. B. Carton



No. 473—Type "J" High Frequency Generator



The Home of Fischer Quality and Service

The following Fischer Guarantee covers all the Outfits listed in this publication:

Any defects in our Apparatus that may develop within twelve (12) months from date of shipment, under normal and proper use, due to faulty material, imperfect insulation or inferior workmanship will be repaired or replaced at our option and our expense provided such apparatus is delivered **prepaid** to our factory.

For repairs or replacements during the second twelve months we will charge only actual coverage cost, and after this period our service and attention are to be called on, when required, with the understanding that charges for overhauling "Fischer" Apparatus will always remain as near actual cost as possible. Our repair department is run entirely for your service.

We will not assume any liability for work done by others without our consent in writing, nor for defects from improper storage.

We will not assume any liability for breakage of glassware, or for deterioration of rubber goods or other perishable articles. We use the best materials obtainable. Rotary Converters not manufactured by us do not carry our guarantee but are backed up by the guarantee of the makers.



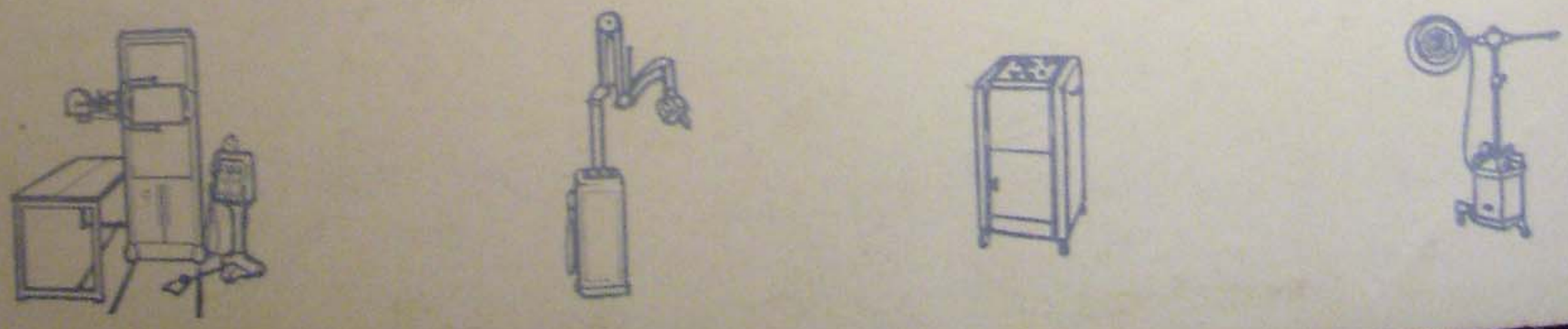


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LOW VOLTAGE THERAPY

COMPILED FROM CURRENT LITERATURE



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Manufacturers
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9451-91 W. BELMONT AVENUE
FRANKLIN PARK, ILLINOIS
(SUBURB OF CHICAGO)

LOW VOLTAGE THERAPY

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Introduction

A highly effective and dependable modality among the many employed for Physical Medicine is that group of electrical currents conventionally termed "low voltage" energies inasmuch as they are seldom, if ever, applied with potentials exceeding 90 to 100 volts.

It has been said that if Low Voltage therapy were simpler to apply there would be more Low Voltage apparatus in use presently, because its field of usefulness is so extensive and results are so reliable.

In virtually every institution concerned with the problems of rehabilitation, the Low Voltage energies occupy a prominent place in the therapeutic approach.

It has been established irrefutably in thousands of cases that many conditions respond favorably to Low Voltage applications after complete failure under other therapies.

Despite this proved effectiveness these energies have not attained the general popularity enjoyed by some of the other agencies widely used by the Professions, a circumstance to be deplored and attributable, probably, to three causes.

First, the existing literature on the subject is not extensive, having been neglected in the profusion of writings on other devices being exploited more recently.

Second, the verbosity of early workers in the field in coining terminology to identify some of the many possible variations of the Low Voltage currents has led to confusion.

And, third, more attention to technic is demanded for Low Voltage modalities than that usually accorded to the many other devices, a fact often inducing Physicians to forego the proved successes of the Low Voltage energies - to the detriment of the patient.

The preparation of this treatise is undertaken with the sole objective of clarifying some of the seeming complications and thus, perhaps, influencing the Professions to return to the use of a therapy for which there is no substitute.

Low Voltage Energies

One of the chief sources of bewilderment in the consideration of the therapeutic uses of the Low Voltage currents is the multiplicity of knobs, dials, control devices, etc., characterizing the modern apparatus from which the various energy forms are derived. And, concurrently arises the question, "Which combination of these should be employed to treat some specific ailment"?

The solution is greatly simplified by following a logical truism - "Think from the Patient to the apparatus rather than from the apparatus to the Patient". In explanation, having established the objective of treatment, the proper selection of the energy form becomes immediately apparent because each variation of Low Voltage energy manifests itself in the form of an immutable therapeutic reaction.

Thus, the seemingly endless variety of energy forms available can be grouped into categories of therapeutic effect and having established these effects, the selection of a current for a particular purpose is self-indicative.

Biologic Effects

When the human organism is subjected to any of the Low Voltage current variations, one of three physiologic reactions is elicited, as follows:

1. Chemical
2. Contractile
3. Simultaneous Chemical and Contractile.

These effects are the result of two basic types of electrical currents - Direct and Alternating. As previously stated, the terminology employed in the literature in referring to these currents shows wide variation - Galvanic for Direct, Rapid Sinusoidal for Alternating, etc. For the sake of clarity these two currents hereinafter are identified by their simple terms - Direct or Alternating.

The polarity effects of the Direct current are so well established that repetition seems superfluous. However, as a point of reference the important effects are again tabulated:

Positive Pole	Negative Pole
Induced acidity	Induces alkalinity
Repels metals and alkaloids	Repels acids and halogens
Attracts acids and halogens	Attracts metals and alkaloids
Influences vasoconstriction	Influences vasodilatation
Coagulant	Hemorrhagic
Sedative	Irritant

It is of interest to note that the physiologic effects derived from the Positive Pole and the Negative Pole of the Direct current are exactly opposed to each other. Thus, in the therapeutic concept, no chemical reaction can be induced from an Alternating current because any effect created by one pole is promptly neutralized by the counteracting effect of the opposite pole following immediately in the constantly recurring alternating sequence.

Hence, the physiologic reactions, previously outlined, may be traced solely to one or the other of these two Basic Currents, as follows:

1. Chemical effect only . . . . . Direct Current

2. Simultaneous chemical and contractile effects. . . . Direct Current

3. Contractile effect only. . . . Alternating Current

A simple doggerel often is used to fix this principle in the memory:

"D.C. (Direct Current) D-rives C-hemicals."
"A.C. (Alternating Current) A-ids C-ontraction."

The initial step, then, in selecting one of the Low Voltage energies for any specific purpose is the determination of the proper Basic Current as indicated by the therapeutic objective, a procedure which may be summarized as follows:

Therapeutic Objective	Basic Current Selection
1. Chemical reaction only (Ion transfer, electrolysis, pH influence.)	Direct Current
2. Simultaneous chemical reaction with muscle contraction. (Denervated skeletal and ennervated smooth muscle stimulus.)	Direct Current
3. Muscle contraction only. (Skeletal muscle stimulus)	Alternating Current

Having determined the proper "Basic Current", the Low Voltage energises may then be modified additionally to more nearly conform to the objective as detailed in following paragraphs.

Wave Forms

If the intensity, or "volume", of a Low Voltage energy is sustained at a fixed level, the biologic effect likewise will be sustained in a propor-

tional intensity. For example, if an alternating current is applied to the motor point of a skeletal muscle and the current strength (voltage-amperage) is maintained at a fixed quantity, the subject muscle will contract to an equivalent degree and remain in such contraction as long as the current volume remains unchanged.

This form of Low Voltage current application has been termed, variously, "constant", "sustained", "continuous", etc. Because it is more descriptive of the physiologic reaction with which the ultimate therapeutic objective is concerned, the designation "Continuous" is used hereinafter to identify this sequence in the application of any of the Basic Currents. It is employed in the main with Direct current for sustained chemical effects. In rare instances it may be used with a contractile current to obtain relaxation in skeletal muscle spasm through inhibition.

If the Technician rythmically advances and retards the "volume" control of the apparatus manually, when using a contractile current, it is quite apparent that the subject muscle will alternately contract and relax in synchronous rythm and equivalent vigor to the movement of the control.

Since such procedure is clinically impractical and inaccurate, provision is made in modern Low Voltage apparatus to create the same effect by mechanical or electronic means. Being an undulating rythmic sequence, the term "Surging" seems best to describe such a current form. This modification of any of the Basic Currents is used entirely for contractile effects, particularly in stimulus for increasing muscle tonicity.

Similarly, if the "volume" control of the apparatus is advanced and retarded quickly and sharply, the resulting muscle contraction is manifested as a sudden twitch or jerk. When such a current sequence is generated in Low Voltage equipment, it is variously termed, "square wave", "interrupted", "pulse wave", etc. As the more descriptive term and to differentiate it from the wave-like undulations characterizing a "Surging" energy, this current form is referred to hereinafter as "Pulsing". It is used with the contractile currents principally for denervated muscles.

Thus - the second step in the selection of a Low Voltage current for a particular purpose is evolved and the selection becomes more purposeful when guided by the therapeutic objectives which may be tabulated as follows:

Therapeutic Objective	Basic Current	Wave Form
1. Sustained chemical effect. (Ion transfer, electrolysis, pH influence.)	Direct	Continuous
2. Sustained muscle contraction. (Relaxation of skeletal muscle spasm through inhibition.)	Alternating	Continuous

Therapeutic Objective (continued)	Basic Current (cont.)	Wave Form (cont.)
3. Rythmic muscle contraction with simultaneous chemical effect. (Stimulation of denervated skeletal or involuntary - smooth - muscle.)	Direct	Surging
4. Rythmic muscle contraction only. (Stimulation of enervated skeletal muscle.)	Alternating	Surging
5. Abrupt muscle contraction with simultaneous chemical effect. (Stimulation of denervated skeletal muscle.)	Direct	Pulsing
6. Abrupt muscle contraction only. (Stimulation of enervated skeletal muscle.)	Alternating	Pulsing

It will be noted in the above tabulation that the Direct current in both Surging and Pulsing wave forms is suggested for stimulation of the denervated - impaired nerve supply - skeletal muscle and the Alternating current in both wave forms is suggested for stimulation of the enervated - intact nerve supply - skeletal muscle.

The choice of Wave Form is determined by the degree of impairment or degeneration. The threshold of stimulation - visible contraction of a muscle - in the severely impaired muscle seems to be obtained with less current volume with Pulsing Direct current than with Surging Direct current.

Likewise, the contraction in the enervated skeletal muscle is more vigorous when induced by the Pulsing Alternating current than by the Surging Alternating current.

Rates of Impulse

The primary intent of Low Voltage contractile currents is the production of muscle contraction as nearly as possible the prototype of normal muscle function. Hence, some control over the number of Surging or Pulsing impulses occurring in any predetermined time interval is necessary.

This "rate of impulse" should approximate the normal rate of contraction of the subject muscle. As a typical example, peristaltic waves in the normal colon occur at the rate of 12 to 15 per minute. If a Low Voltage

contractile current is to be used in that region, as in the treatment of chronic constipation, it is self-indicative that the Low Voltage Generator control should be adjusted to deliver approximately 12 to 15 surges per minute.

Also, the tonus of the subject muscle must be considered. Manifestly, violent exercise immediately following long immobilization, as in casting for a fracture, is contra-indicated. The sensible course is a graduated series of exercises. Excessively rapid and vigorous contractile stimulation of an atonic muscle by means of a Low Voltage energy is equally contra-indicated. The approach should be gentle stimulus, increasing rapidity of impulse and intensity of vigor only as the tonicity progresses.

In general it may be said that the optimum rate of impulse may be guided somewhat by the length of the subject muscle, i.e., the longer the muscle, the slower the rate of impulse; and the shorter the muscle, the more rapid the rate of impulse.

However, this judgment must be tempered, always, by the existing state of tonicity in the muscle involved.

The Three Primary Factors

At this point it will have been noted that the selection of the proper Low Voltage energy for a specific treatment has become merely the determination of three prime factors as indicated by the therapeutic objective. In summary the progressive steps are:

Step 1. - Determination of the Basic Current - Direct or Alternating - according to the chemical, simultaneous chemical and contractile, or contractile effect desired.

Step 2. - Determination of the Wave Form - Continuous, Surging or Pulsing - according to the desired continuity of the Basic Current selected.

Step 3. - Determination of the Rate of Impulse, the number of surges or pulses occuring per second or minute when using other than the continuous Wave Form.

In some modern Low Voltage apparatus further modification of the Basic Currents is incorporated. One modification is selective control of the number of cycles per second - frequency - of the basic Alternating current, for example, 18 to 3000 cycles. The effects of frequency variation are detailed in a subsequent section.

Alternating Current Frequencies

Domestic commercial Alternating electrical current usually is supplied in a frequency of 50 or 60 cycles - complete alternations comprising one positive half cycle and one negative half cycle - per second, 3000 to 3600 cycles per minute.

It is an established fact that the two physiologic reactions - motor nerve response and sensory nerve response - elicited by the application of an Alternating current are directly proportional to the frequency of alternation.

It is estimated, broadly, that the motor nerve response disappears at frequencies in the order of 10,000 cycles per second and sensory nerve response ceases at frequencies in the order of 1 million cycles per second. In fact, the development of High Frequency Diathermy apparatus was based on this principle.

Selective frequency control of the Alternating Basic Current provides two advantageous variations in Low Voltage applications. First, painful skin effects may be reduced by selection of a frequency sufficiently rapid to minimize sensory nerve response. Since the sensitivity varies in different individuals, no graded rule can be established.

Secondly, and more important, authorities agree that the existing tonus of the muscle governs the optimum frequency selection. In substance, Grodins, Osborne and Ivy found that the threshold stimulation for normal muscle with the least current intensity was in the order of 3000 cycles per minute whereas for polio and peripheral nerve injuries the best response was from 30 to 1500 cycles per minute.

Again, no hard and fast rule can be established but the principle can be correlated in the findings of Kosman, Osborne and Ivy: "The current selected therefore, must be able to produce a vigorous response in the muscle. Such a response, however, must be secured with a current intensity that can be tolerated by the patient".

Summary

To summarize the rationale of "thinking from the Patient to the apparatus", analysis of a hypothetical case may serve best to illustrate the train of thought.

Consider a case of simple trapezius Torticollis - wry neck. Obviously, the therapeutic objective is relief of the muscular spasm. It is logical to assume that this can be accomplished by inhibition through vigorous contraction to - in the words of the laity - "untie the knot".

But, being hypersensitive some sedation should be considered as a preliminary measure. This may be heat or, more effective, vasodilatation by Direct current. Thus, two stages of treatment are presented, (1) the preliminary step of sedation which immediately recalls the Positive Pole effect of the Direct current. And, since contraction is contra-indicated

until a later stage of treatment, the Direct current must be used in a Continuous form to avoid contractile stimulus. So, for the initial step the current selection is self-indicative - Continuous Direct.

For the inhibitory stage contraction is indicated. And, since it would seem that continued vasodilatation would also be of value, the Direct Basic Current - being the only one which will induce vasodilatation by polarity effect - remains the choice. Then, the contractile effect must be induced by either the Surging or Pulsing wave form. Finally, because the vigor of the jerking type of contraction tends to inhibition sooner than an undulating rythmic contraction, the indication is Pulsing. Thus, the second stage of treatment becomes, manifestly, an application of Pulsing Direct current.

Concurrently, a process of elimination may be used to select an appropriate Low Voltage energy for the involvement to be treated. Violent massage would never be used on the tenderness of an acute sprain, a condition in which the Low Voltage energies demonstrate complete superiority over many other agencies, when properly employed. On this line of reasoning the Pulsing form of either of the Basic Currents is eliminated because of its harsher response. Likewise, over-tiring of an already atonic muscle is not to be considered so the use of a Continuous contractile wave form is eliminated. Thus, only the Surging Wave Form remains and this is the modification of choice.

It has not been uncommon in the treatment of Neuritis with thermal devices, to find that the treatment accentuates the pain rather than relieve it. In such cases the Low Voltage energies again demonstrate their excellence. And, the introduction in recent years of vasodilating drugs, such as mecholyl and histamine, which lend themselves readily to "ion transfer" has enhanced the value of the Low Voltage principle.

Ion Transfer, variously called "iontophoresis", "ionic medication", "ionization", etc., is based on the principle that ions "driven" by the repelling force of like polarity by a Direct electric current penetrate more deeply into tissue than that obtained from topical applications of the same remedy. Likewise, vasodilating drugs can be introduced with a greater degree of safety, than with hypodermic injections, because the dosage can be more easily controlled and the effect stopped instantly in case of severe reaction.

When the doggerel, "DC drives chemicals", is recalled, the selection of the proper Basic Current for this procedure cannot be mistaken. It can be only the Direct current. And, again since contraction has no bearing on the objective, the wave form can be only Continuous. Finally, being a Continuous wave form, the "rate of impulse" control becomes inoperative and is ignored.

From this precept there should be no difficulty in selecting a proper Low Voltage energy to attain a predetermined therapeutic objective. And, instead of a bewildering multiplicity of controlling devices, the Low Voltage Generator becomes merely a group of three selective modifications (Continuous, Surging, Pulsing) of two Basic Currents (Direct, Alternating) with means for controlling the number of muscular contractions induced per second, or minute, (Rate of Impulse) by the surging or pulsing Wave Forms.

Therapeutic Fundamentals

Low Voltage procedures may be grouped into three general categories:

a. - pH Influence ("Medical Galvanism")
or Ion Transfer ("Iontophoresis")

b. - Tissue destruction by Electrolysis

c. - Muscle stimulation

With the exception of Electrolysis, all treatments are conducted with two wet pad electrodes in skin contact to introduce the current. In Electrolysis, one wet pad in skin contact and one bare metal electrode are employed.

Unless Ion Transfer is indicated, the electrodes should be wet with tap water only. The addition of salt, soda or similar substances merely tends to crystallization upon drying, and an increase in unpleasant skin pricking when again moistened.

Thorough saturation of wet electrodes is required. The most certain method is soaking in warm water for at least ten minutes before use. Excess moisture can then be expelled by squeezing the electrode lightly.

In all applications the current intensity should be increased slowly. The skin sensory effects experienced at the beginning of a treatment are due to inherent resistance of the skin which lessens under the influence of the current. Thus, the dosage can be increased gradually as the skin resistance decreases with virtually no sensation of discomfort.

Any abrasion of the skin in the field of electrode application must be protected to avoid concentration of the current at such a point due to the lessened skin resistance. A coating of collodium, tape or any other similar expedient suffices.

If the polarity influence of either of the Direct Current poles is to be used, a wet electrode of relatively small surface area, hereinafter designated as the "active" electrode, is connected to the selected pole and applied to the area to be treated. The opposite Direct Current pole is connected to a wet electrode of greater surface area, hereinafter termed the "dispersive" electrode, and applied at some remote part of the body to complete the circuit.

In muscle stimulation an "active" electrode small enough to confine contact to a single motor point is recommended. Obviously, if only a flexor muscle is involved it is good therapy to limit stimulation to it alone. An "active" electrode large enough to embrace a number of adjacent motor points, inducing simultaneous stimulation of several related muscle groups may defeat correction of a functional imbalance between a flexor and extensor muscle if both are stimulated alike.

In muscle stimulation procedures it is suggested that the "dispersive" wet electrode be placed on the spine over the point of emergence of the nerve root supplying the subject muscle. For example, in treatments involving an upper extremity the "dispersive" electrode should be placed on the spine in the upper dorsal area; for a lower extremity, over the sacrum, etc.

For conditions involving a nerve, such as brachical neuritis, sciatica, etc., the electrodes may be placed in a manner to favor the nerve course. As an illustration, in Direct current application for brachical neuritis the Positive pole "active" electrode may be placed over the brachical plexus and the Negative pole "dispersive" electrode on the palm of the hand.

For sciatica the Positive pole "active" electrode may be placed over the sciatic notch and the Negative pole "dispersive" electrode under the popliteal space at the knee; or, if the distress so indicates, the "active" Positive pole may be placed over the popliteal space and the "dispersive" Negative pole on the sole of the foot.

Stimulation of abdominal musculature may be induced by either of two methods - local or "reflex". In local stimulation the "dispersive" pad may be placed posterior over the lumbar area and the "active" pad anterior at various points on the abdomen. A conventional plan in the local method is to begin the stimulation at the ileocecal juncture - lower right quadrant - and progressively follow the course of the ascending, transverse and descending colon.

In the "reflex" method - stimulation through the sympathetic nerve system - two small pads of equal size are placed posterior, one on each side of the spine, to cover the coeliacum ganglia, located about two inches laterally on each side of the spine at the level of the third thoracic (dorsal) vertebra. In this procedure care must be exercised to keep the skin area between the two pads thoroughly dry to eliminate a convenient path of less resistance on which the current could complete its circuit and minimize the desired effect on the ganglia.

In all muscle stimulation procedures, as previously stated, the tonus of the subject muscle should be the factor governing the duration of treatment in the initial stage. The demonstration of muscle contraction by Low Voltage stimulation is an interesting and spectacular phenomenon and the temptation is ever-present to extend the treatment period unnecessarily. A more constructive program is an initial application limited to a few contractions with progressive increase in subsequent treatments. In this respect it is not unusual in severe paralysis and muscle damage to limit the first treatment to no more than one or two visible contractions.

Ion Transfer or pH Influence with Direct Current may be administered conveniently to the hands or feet by immersing the member in a water-filled - or in the case of Ion Transfer, the solution of choice - insulated utensil. Ordinary glass or plastic houseware utensils are excellent for this purpose. To conduct the current a strip of metal - the block tin used with Spark Gap Diathermy apparatus serves admirably - is bent to the contour of the utensil and immersed in the fluid with one end overlapping the side to retain it. In use the subject member should <u>not</u> contact the metal conducting strip.

If the immersion method is used, the point of contact between the skin and surface level of the fluid must be protected to eliminate current concentration and excessive skin effects. This is easily accomplished by spreading a layer of vaseline, or some similar unguent, about an inch in width to completely encircle the subject member. It should be so placed that the surface level of the fluid reaches approximately the middle of the protective band when the member is immersed in the solution.

In the immersion method the solution-filled utensil becomes the "active" electrode and is connected to the indicated pole of the Direct Current. The "dispersive" electrode may be a large wet pad placed at any convenient point to complete the circuit.

In recent years the Ion Transfer of histaminic drugs has become a valued addition to Low Voltage Therapy to induce prolonged vasodilatation. The product, "Mecholyl", Merck & Co., Inc. has attained great popularity, probably because of its greater concentration and convenient packaging. The effects are the same as for histamine. "Mecholyl" is used in aqueous solution of 0.2 to 0.5 percent.

Either the local or immersion methods may be used for "Mecholyl" administration. In the local method, as for an articulation such as the shoulder, knee, elbow, etc., the "active" electrode is prepared as follows: Thin asbestos paper - that used for insulating heating pipes is excellent - or a pad of several layers of gauze is saturated with the "Mecholyl" solution and wrapped around the subject member. Over this is placed a layer of tin foil, which should be of slightly less width than the moistened pad to allow about one-half inch of the pad to extend beyond each edge of the foil. The positive pole of the Direct Current is connected to the tin foil by any suitable clip and the entire assembly is held firmly in place by a bandage wrapping. The "dispersive" Negative pole is the customary large wet pad placed at any point to complete the circuit.

In the administration of "Mecholyl" by the immersion method, the procedure is exactly the same as previously described. The same precautions for skin protection at the fluid surface level and for avoiding skin contact with the bare metal current-conducting strip must be observed.

A number of writers have reported excellent success in the treatment of Fungus Infections of the hands and feet by Ion Transfer of copper using a 5% solution of copper sulphate as the medium and the Positive pole of the Direct Current as the impelling force. The immersion method is the procedure of choice in such cases. If both hands or feet are involved and the solution utensil is not of sufficient size to contain both members, two smaller utensils may be employed as the "active" electrode by connecting the two conducting strips together with a piece of wire so that both are common to the Positive pole of the apparatus.

Applications for the bactericidal action of copper or zinc frequently are used for non-specific vaginal infections. The method employs the Ion Transfer principle in which a carbon electrode - inert to the migration of ions from the electrode - is padded with cotton saturated with a 5% solution of zinc or copper sulfate and placed in contact with the vaginal mucosa. Connected to the Positive pole of the Low Voltage Generator it becomes the "active" electrode with the usual larger "dispersive" electrode placed under the sacrum of the reclining patient.

"Electrolysis" implies the destruction of tissue by means of the chemical action of the Direct Current when concentrated in relatively large volume on a comparatively small area. It is used extensively for permanent removal of superfluous hair through destruction of the hair follicle and other procedures in which the actual destruction of tissue is the objective. The treatment of Hemorrhoids, Cervical Stenosis, Cervical Erosions, and similar procedures are predicated on the electrolytic theory.

The principle of "Electrolysis" is best illustrated by a simple experiment. If the tips of the conducting cords from the treatment terminals of a Low Voltage Generator are immersed in a solution of ordinary salt water, a visible phenomenon appears when the Direct Current is turned on. It will be seen that bubbles arise in the solution from both of the cord tips with more forming about one of the tips than around the other.

The action which takes place under these conditions is a breaking down of a chemical compound comprised of "H2" (hydrogen) "O" (oxygen) - the water - and "Na" (sodium) "Cl"(chlorine) - the salt (sodium chloride). The first-named chemical of a compound is inherently of Positive polarity and the second-named, Negative polarity. Thus - from the law of physics that "like poles repel and unlike poles attract", a migration of the ions in the compound takes place under the polarity influence of the Direct Current.

The Positive Hydrogen and Sodium ions are repelled by the Positive pole of the Direct current and are attracted to the Negative pole. Likewise the Negative Oxygen and Chlorine ions are repelled by the Negative pole of the Direct current and are attracted to the Positive pole.

These clouds of ions accumulating around the respective cord tips account for the visible phenomenon previously mentioned. The bubbles formed at the cord tips arise from the Oxygen concentration around the tip of Positive polarity and the Hydrogen concentration around the tip of Negative polarity. Consequently, more bubbles form at the Negative pole because of the composition of the water, H2O, in which there are twice as many Hydrogen ions (H2) as there are Oxygen ions (O). This test, incidentally, is a convenient method for determining the polarity of a Direct Current application.

A second invisible action takes place through the ion movement in the formation of new chemical compounds at the respective cord tips. Some of the Positive Hydrogen ions come in contact with the Negative cord tip and lose their normal charge to become nascent ions bearing the Negative polarity transmitted by the stronger influence of the pole contacted. In this state, they are capable of uniting with ions of unlike polarity, so, they unite with adjacent Positive Sodium and Oxygen ions in the vicinity to form "NaOH" - Sodium Chloride.

Concurrently, some of the Negative Chlorine ions contact the cord tip of Positive polarity and assume its Positive charge enabling them to combine with some of the Negative Hydrogen ions in the area to form "HCl" - Hydrochloric Acid. From these mutations are adduced the maniliar polarity characteristics of the Direct Current, namely, "Positive pole - Acid reaction", "Negative pole, alkaline reaction". And these are the characteristics upon which the principle of "Electrolysis" for tissue destruction is based.

The fluids of the human body contain chemical compounds which are subject to the same disassociation, ion migration and formation of new compounds as those used in the foregoing experiment. By concentrating the Direct current on a small enough area, the formation of these caustics may be created in sufficient intensity to destroy tissue.

In the treatment of Hypertrichosis (Superfluous Hair) a very fine needle, especially made for the purpose, is inserted along the hair shaft to contact the follicle. Connected to the Negative pole of the Low Voltage Generator it becomes the "active" electrode. The Positive "dispersive" electrode may be a large wet pad under the palm of the hand, or a utensil containing salt water solution to be used by the immersion method, in which the patient alternately immerses and withdraws the fingers to "make" and "break" the circuit. The current concentration on the small area of the needle is highly intensified and the production of the Sodium Chloride at this point destroys the hair follicle through its caustic action.

A similar procedure is used in the obliteration of Hemorrhoids. In this instance another type of needle, designed for this particular application, is inserted into the Hemorrhoid as the Negative "active" electrode and a large Positive "dispersive" wet electrode is placed under the hip to complete the circuit.

There are two paramount reasons for using the Negative pole for these and similar "Electrolysis" procedures. First, it has been noted that the action of the Positive pole "repels metals. Hence, the movement of ions from the needle into the tissues creates a "tattooing" which certainly must be avoided. Secondly, it will have also been noted that the action of the Positive pole is "coagulant". If the Positive pole is used in contact with mucosa, the coagulant effect causes sticking of the bare metal electrode in contact with the tissue to the point that the area may be denuded of tissue in attempting to remove the instrument.

A number of conditions are amenable to treatment by "Electrolysis". The softening and stretching of Strictures of the Esophogus and Urethra by means of Negative pole applications has been known for years. Suitable olive-type electrodes in graduated sizes are passed through the constricting band in progressive treatments. Functional Cervical Stenosis with all of its sequelae may often be relieved on the same basis. Again, electrodes designed for the purpose are required. Endometritis and Cervical Erosion are subject to the same approach. All such applications are predicated on the production of caustic Sodium Hydroxide at the Negative pole of Direct Current to devitalise the tissue by "chemo-coagulation".

It is not practical to establish a rigid time of treatment for Low Voltage Therapies. In each category the duration of the application must be judged according to the therapeutic objective. For example, as has been stressed previously, regenerative muscle contraction will be governed by the tonus of the subject muscle. Inhibitory muscle contraction for relief of spasm must be of sufficient duration to induce the desired relaxation. In Ion Transfer the duration of treatment will be governed by the amount of current - milliamperage - employed in the individual application. The safest guide is the long-established rule of"tolarance".

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GENERAL THERAPEUTIC PROCEDURES

Electrodes must be maintained in firm contact with the patient's skin throughout the treatment period. This may be accomplished by placing the electrode under the reclining patient, by weighting with sand bags, by retaining with rubber bandage or any similar expedient.

If the electrodes tend to dryness during an extended period of treatment, the water, or other indicated solutions, may be replenished conveniently from a syringe of the Asepto type. The solution is added very solwly at the exposed edges of the electrodes.

The current volume should be increased slowly for all treatments and especially so with Direct current applications. It will be found that much greater current intensity can be applied with less discomfort to the patient if a full minute is utilized in advancing the current intensity to the possible maximum.

In Electrolysis and Ion Transfer it is advisable to double check the polarity of the cord to be attached to the active electrode. This can be done by a salt water method described on page 12, or, by using moistened red litmus paper which will turn blue from the alkaline reaction at the Negative pole when the two cord tips with current flowing are touched to it.

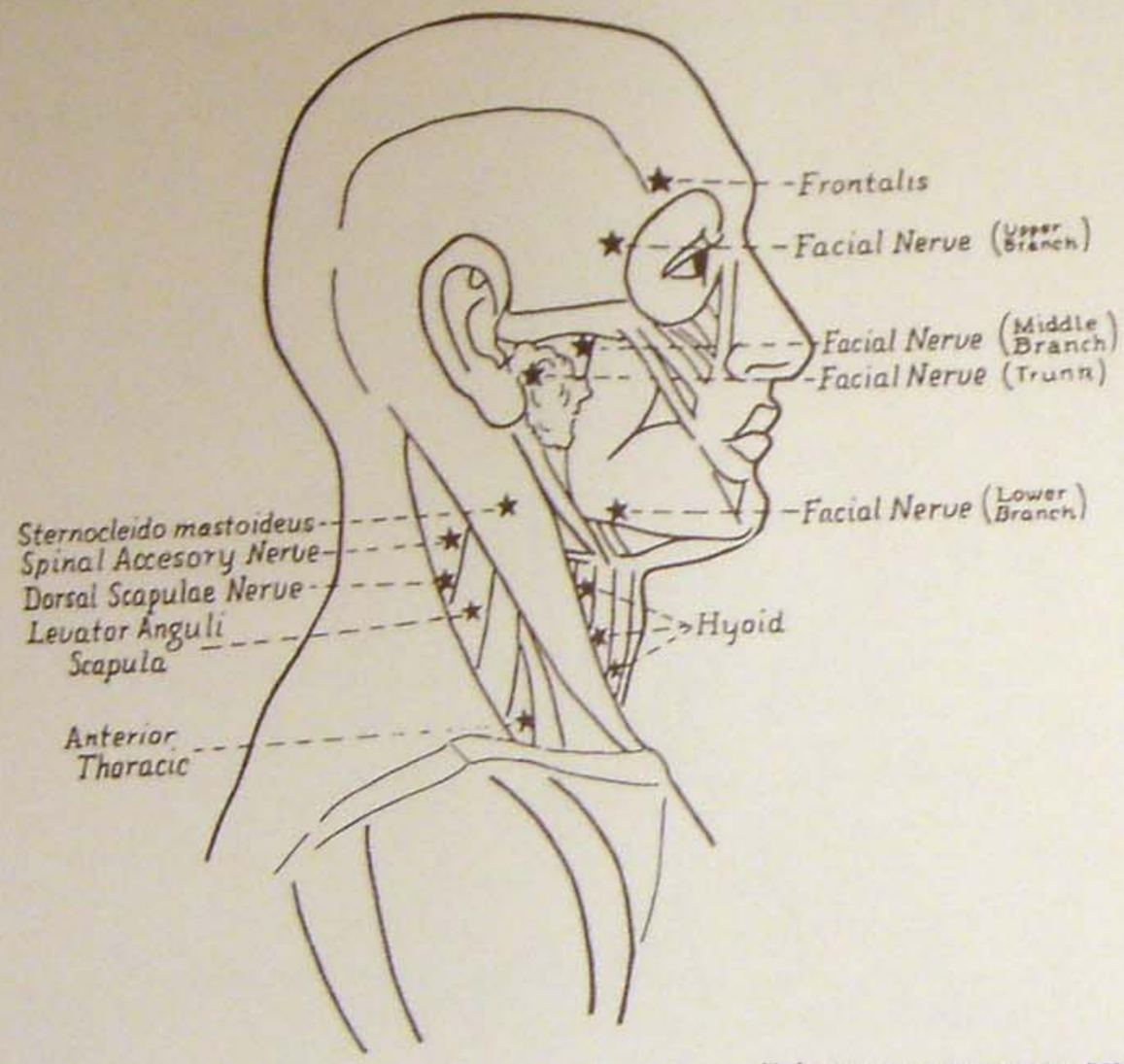
Open abrasions of the skin, excepting ulcers toward which the treatment is deliberately directed, must be covered with a coating of collodium, tape or other protective material if they appear in the field of electrode application. Of course, this does not apply in such conditions as fungus infections in which, again, the treatment is directed toward the infection.

Use and Explanation of the Fischer Electro-Diagnostic Charts

Galvanic and Contractile Currents Generators afford excellent means for making correct electrical diagnosis to determine the degree of paralysis and reaction of degeneration.

The following general rules must be observed.

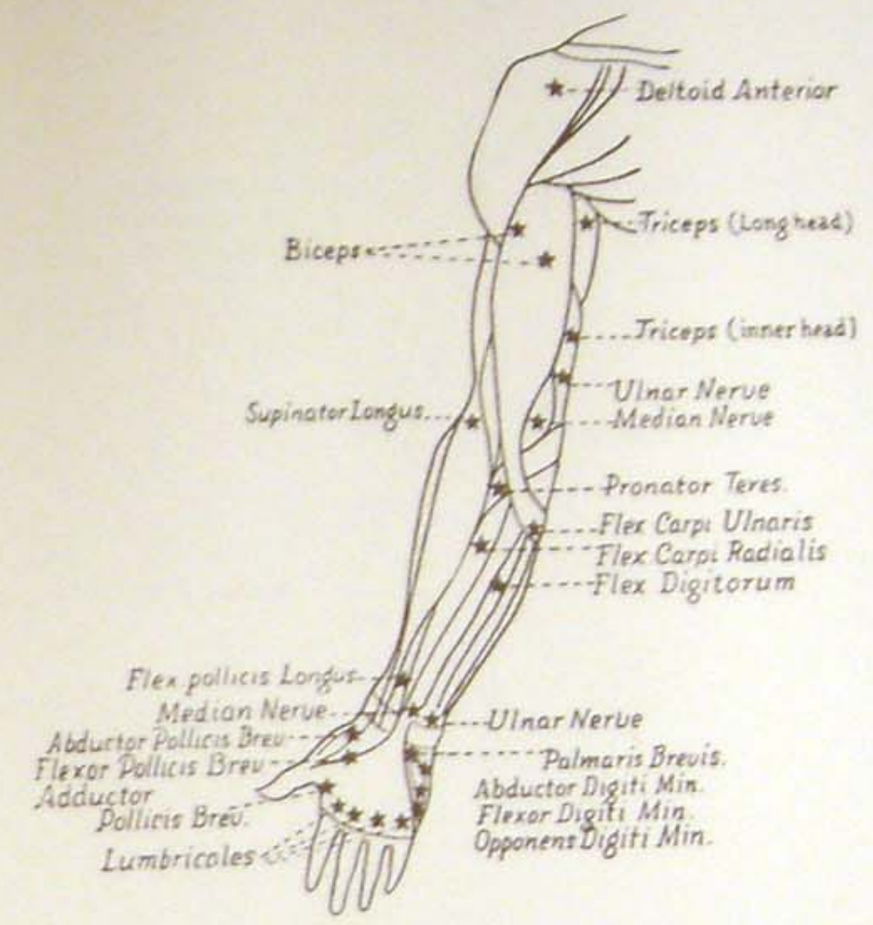
The principal requirement of this method is to localize the current of required density and strength upon parts of the body marked



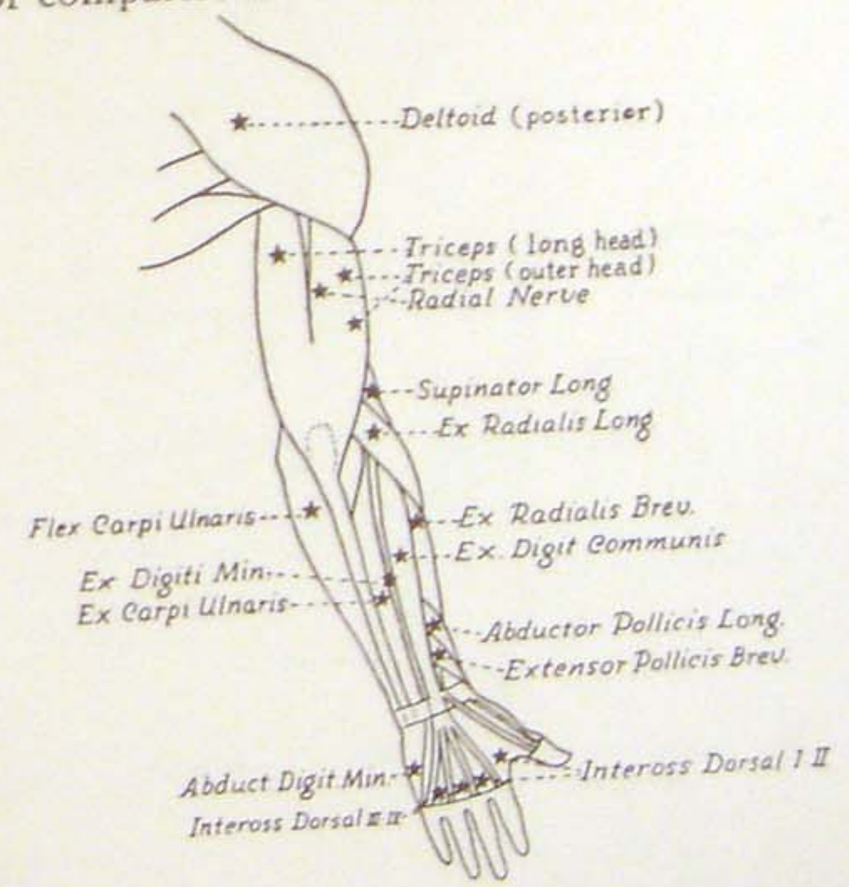
for investigation, avoiding as much as possible unnecessary excitation of the neighboring structures.

One pole or electrode only should be used for each muscle or nerve reaction expected, and while it is necessary to have a second electrode somewhere to complete the circuit, it is desirable to place this second electrode so as to eliminate effects at its point of contact. It is called the indifferent electrode. It should be much larger than the exciting electrode, which must be of the proper shape and size (usually one inch long by one-half inch wide) not to overlap adjacent tissue.

The operator should become fully familiar with his apparatus and practice by experimentation, possibly upon himself, so as to secure dexterity in manipulation. To secure accuracy in the interpretation of his results, it is advisable to test healthy parts, especially

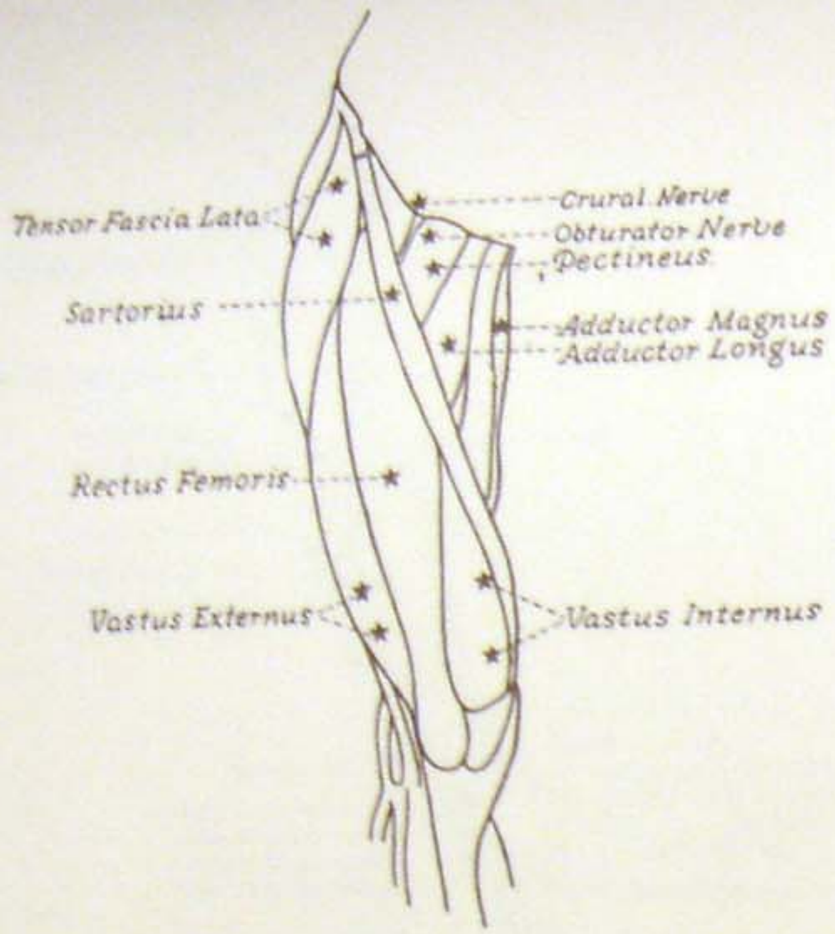


if there is only one side of the body diseased, so that one may obtain a standard of comparison.

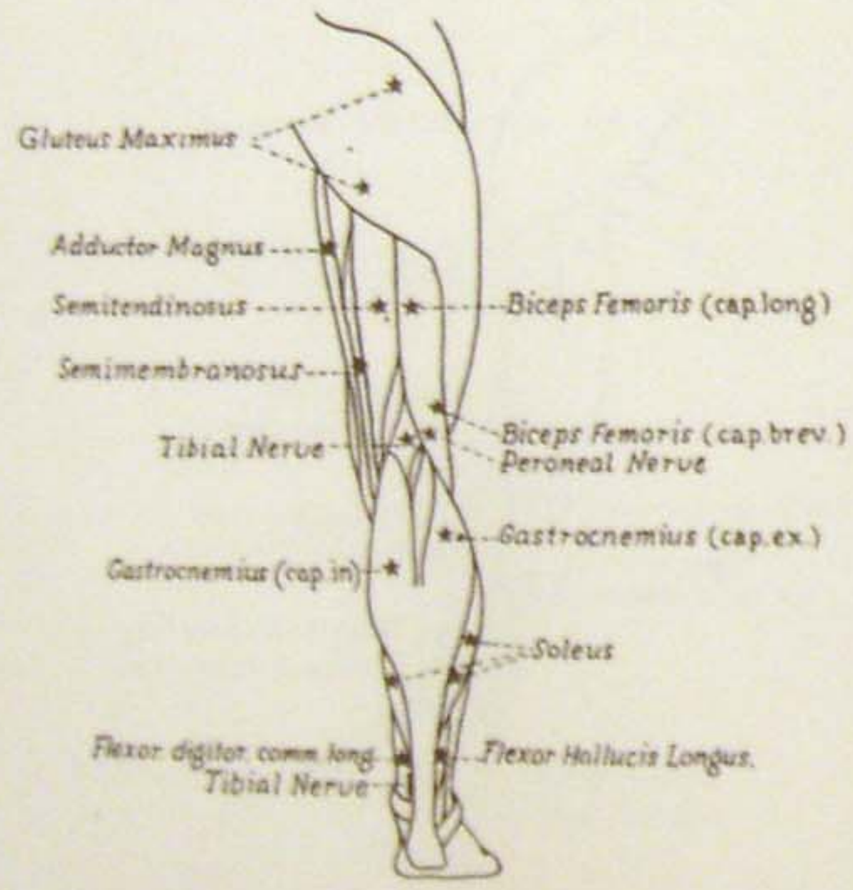


It should always be kept in mind that deeper and more pronounced contractions are obtainable by the pulsating direct current than the others. To determine the strength of the current to be used,

the resistance of the parts under examination indicated by the distance between the poles and the degree of paralysis must be considered.



You will observe in the charts reproduced, stars marking the motor points of the muscles and the exits of important nerve trunks, at

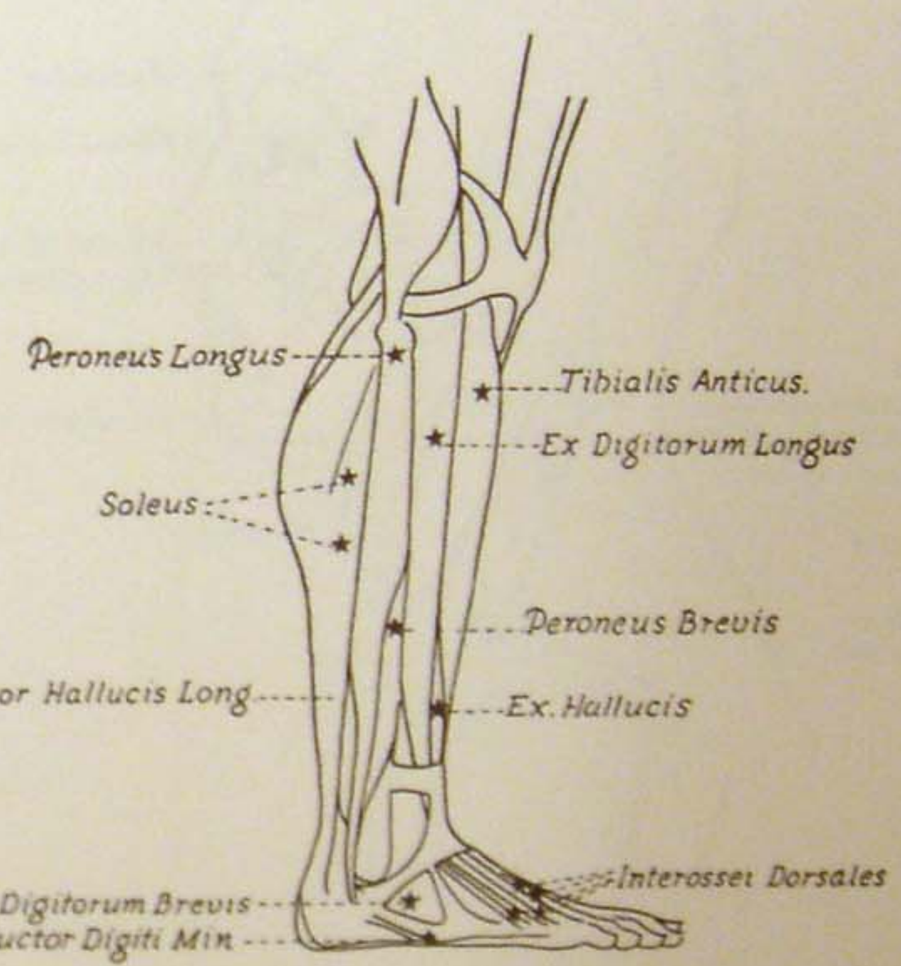


which points electrical susceptibility is the greatest. Application to any of those points about the facial muscles would be more susceptible and less current, therefore, would be required than would be necessary in a similar exploitation of the deltoid muscles or along the sciatic nerve, or similar comparisons in different parts of the body. Reactions are different for different parts of the body, for different patients, also they are modified by disease, either increased or decreased. In sensory involvements, motor reactions may be produced without the patient experiencing much sensation, if any.

Electrical applications to a nerve exit or muscle motor point to determine the amount of excitation should be placed on the spot indicated, by means of the interrupter handle electrodes. This is the better method, although sudden, direct contact is also possible.

Do not move the active electrode in an indifferent manner over the area under examination, as that is not only unsatisfactory, but likely to give the patient an unpleasant muscle contraction.

For all the muscles about the face and neck, the indifferent or



larger electrode may be placed over the lower cervical or upper dorsal vertebra and the various points determined from that.

In the examination of the arm the indifferent electrode may be placed over the nerve supply on the back and the active one over the nerve or muscle or set of muscles, under consideration. If one muscle only is involved, the indifferent electrode may be fastened at the upper insertion of the muscle and the active one applied at the motor point below.

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A D D E N D U M

Suggested Technics for LOW VOLTAGE APPLICATIONS

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The following suggestions for the application of Low Voltage Therapy represent a review of current literature and recent opinions of recognized authorities on the subject. Specific procedures are limited mainly to general principles and it is recommended that the Physician revise and modify these as desired to accommodate unusual individual requirements.

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ADHESIONS, Fibrous (Preventative)

Objective:	Mild contractile stimulation to discourage formation of adhesions following injury or surgery.
Basic Current:	Alternating, 2500 cycles per minute frequency.
Wave Form:	Surging.
Rate of Impulse:	30 to 40 surges per minute.
Active Electrode:	3" x 3" wet pad over motor points of subject muscles.
Dispersive Electrode:	6" x 8" wet pad over spinal nerve root of subject muscle motor nerve branch.
Duration:	5 to 10 minutes of mild contractions daily or every other day exercising care to avoid additional trauma.
Comment:	The same procedure may be inaugurated following abdominal surgery as soon as the scar has fully healed. In this case the active electrode is placed directly over the site of the scar.

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ANKYLOSIS, Fibrous

Objective:	Extension of articular motion through decrease in fibrotic limitation by contractile exercise.
Basic Current:	Alternating, 360 cycles per minute frequency.
Wave Form:	Pulsing.

ANKYLOSIS (continued)

Rate of Impulse:	2 to 4 pulses per second.
Active Electrode:	Muscle testing electrode with small disc over individual motor points, or 3"x3" wet pad over motor point groups, of subject muscles activating articulation involved.
Dispersive Electrode:	6"x8" wet pad over spinal nerve root of subject muscle motor nerve branch.
Duration:	Beginning with 1 or 2 minutes of strong contractions, increase gradually in daily treatments to a total of 15 to 20 minutes.
Comment:	Ankylosis of long standing will necessitate proportional long and vigorous treatment. Resistive motion and corrective exercise are valuable adjuncts in these cases.

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ARTHRITIS

Objective:	Relief of pain and arrest of arthritic process through prolonged vasodilation by ion transfer of "Mecholyl", 0.5% aqueous solution.
Basic Current:	Direct.
Wave Form:	Continuous.
Rate of Impulse:	None. Inoperative on continuous wave form.
Active Electrode:	Connected to "Positive" pole. See "Comment".
Dispersive Electrode:	Connected to "Negative" pole. See "Comment".
Duration:	3 to 15 minutes twice weekly, time being dependent upon current quantity employed. (2 to 3 milliamperes per square inch of active electrode area is suggested.) Discontinue at first sign of any untoward systemic reaction, profuse general perspiration, tachycardia, etc.
Comment:	Refer to Page 11, "Low Voltage Therapy", for details covering the preparation of electrodes for the local or immersion methods.

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BELL'S PALSY

Objective:	Stimulation of facial muscles to sustain tonus and accelerate return to normal function.

motor point below.

...muscle points electrical susceptibility is the greatest. Application to any of those points about the facial muscles would be more susceptible and less current, therefore, would be required than would be

BELL'S PALSY (continued)

Basic Current: Alternating, 120 to 2500 cycles per second frequency. Select frequency inducing best contraction with least amount of current.

Wave Form: Surging.

Rate of Impulse: 50 to 60 surges per minute.

Active Electrode: Muscle Testing electrode with small disc over individual motor points of facial muscles involved.

Dispersive Electrode: 4" x 6" wet pad over cervical spine.

Duration: 1 minute of visible contractions in each of the involved muscles. Increase gradually in daily treatments.

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BURSITIS

Objective: Relief of pain and diminution of inflammatory process by prolonged vasodilatation from ion transfer of "Mecholyl", 0.5% aqueous solution.

See "Arthritis" for detailed Technic.

Alternate

Objective: Same as above.

Basic Current: Direct.

Wave Form Continuous.

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Positive pole. 3"x3" wet pad over affected Bursa.

Dispersive Electrode: Negative pole. 4"x6" wet pad at any remote point.

Duration: 10 minutes with 20 to 30 milliamperes, daily in the acute stage.

Comment: After acute symptoms subside, follow with contractile energy as outlined under "Adhesions, Fibrous".

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CERVICAL EROSION

Objective: Destruction of eroded tissue by Electrolysis.

Basic Current: Direct.

Wave Form: Continuous.

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Positive polo. Special bell-shaped bare copper electrode on insulated handle contacting eroded area.

Dispersive Electrode: Negative polo, 6"x8" wet pad on abdomen.

Duration: 5 to 15 milliamperes until surface of eroded area turns grayish-white, usually 5 to 10 minutes. Reverse polarity for 1 minute before removing electrode from tissue.

Comment: In the absence of the special bell-shaped bare copper electrode, the same Technic can be used from a carbon ball electrode wrapped in cotton saturated with 5% solution of zinc or copper sulfate.

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CERVICAL STENOSIS, Functional

Objective: Dilation of the cervical canal by Electrolysis.

Basic Current: Direct.

Wave Form: Continuous.

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Negative polo. Special bare copper cervical dilating electrodes in graduated sizes on insulated handle contacting external os.

Dispersive Electrode: Positive polo. 6"x8" wet pad on the abdomen.

Duration: 3 to 5 milliamperes until dilator slides into cervical canal under gentle pressure.

Comment: The smallest size of cervical dilator is used for the initial treatment and successive larger sizes are used for each subsequent treatment. The tip of the dilator is engaged in the external os and gentle and continuous pressure is maintained until the instrument slides into the canal easily through the foaming action of Electrolysis. Repeat once weekly.

CONSTIPATION, Chronic

Objective:	Increase in motility of colonic musculature through improvement in tonus.

Local Method

Basic Current:	Alternating, 360 to 720 cycles per second frequency.
Wave Form:	Surging.
Rate of Impulse:	12 to 15 surges per minute.
Active Electrode:	3"x3" wet pad placed over ileocecal juncture.
Dispersive Electrode:	6"x8" wet pad over the spinal lumbar area.
Duration:	10 to 15 minutes total - see "Comment" - repeated daily with decreased intervals as condition warrants.
Comment:	The Active pad electrode remains in one position until four or five vigorous contractions have been induced. Then, it is moved about two inches for the next 4 or 5 contractions until the entire course of the ascending, transverse and descending colon have been traced on the abdomen.

Reflex Method

Basic Current:	Alternating, 360 to 720 cycles per second frequency.
Wave Form:	Surging.
Rate of Impulse:	12 to 15 surges per minute
Active Electrode:	3"x3" wet pad under reclining patient and covering coeliacum ganglion on one side of the spine - about two inches laterally at the level of the third thoracic vertebra.
Dispersive Electrode:	3"x3" wet pad covering coeliacum ganglion on opposite side of spine.
Duration:	10 to 15 minutes vigorous contractions repeated daily with decreasing intervals as condition indicates.
Comment:	Mental habit-forming training in fixing some convenient established hour for attempting voluntary evacuation, elimination of any diversion during this period, etc., should be instituted at the beginning of treatment.

DYSMENORRHEA, Functional

Objective:	Relief of distress through pH influence and improvement in functional tonicity through contractile stimulation.
Basic Current:	1st stage, Direct. 2nd stage, Alternating, 720 cycles per second frequency.
Wave Form:	1st stage, Continuous. 2nd stage, Surging.
Rate of Impulse:	1st stage, none. Inoperative on continuous wave form. 2nd stage, 15 to 20 surges per minute.
Active Electrode:	1st state, Negative pole. 4" x 6" wet pad on abdomen over uterus and ovaries. 2nd stage, same.
Dispersive Electrode:	1st stage, Positive pole. 6" x 8" wet pad under lumbar area. 2nd stage, same.
Duration:	1st stage, 10 to 15 minutes with 25 to 30 milliamperes. 2nd stage, 10 minutes vigorous contractions.
Comment:	Following the initial application of Direct current, without changing the positions of the electrodes, the controls of the apparatus are changed as indicated above for the contractile action. Three treatments weekly between periods is suggested.

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ENDOMETRITIS

Objective:	Destruction of infected tissue by Electrolysis.
Basic current:	Direct.
Wave Form:	Continuous.
Rate of Impulse:	None. Inoperative on continuous wave form.
Active Electrode:	Positive pole. Special bare copper intra-uterine electrodes with insulated tip to prevent puncture of fundus when inserted into the uterus to contact the endometrium.
Dispersive Electrode:	Negative pole 6" x 8" wet pad on abdomen.

ENDOMETRITIS (continued)

Duration: 10 minutes with 5 to 10 milliamperes each week or 10 days. BE SURE TO REVERSE POLARITY FOR 2 OR 3 MINUTES BEFORE ATTEMPTING WITHDRAWAL OF THE INTRA-UTERINE ELECTRODE!

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FIBROSIS

Refer to "Ankylosis, Fibrous" for detailed Technic.

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FLAT FOOT

Refer to "Pronation" for detailed Technic.

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FRACTURES

Refer to "Sprains, Strains" for detailed Technic.

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FUNGUS INFECTIONS

Objective: Arrest of infection by ion transfer of copper. (Pereyra suggests 5% solution bis cupric sulfate - trimethylenediamino - with Aerosol MA added to inhibit binding of copper by tissue proteins.)

Basic Current: Direct.

Wave Form: Continuous.

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Positive pole, immersion method. See "Comment".

Dispersive Electrode; Negative pole. 8"x10" wet pad on torso at terminal of extremity.

Duration: 15 to 20 minutes with current equivalent to 2 to 3 milliamperes per square inch of active electrode area.

Comment: See Page 11, "Low Voltage Therapy" for details covering the preparation of electrodes for the local or immersion methods.

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HEMORRHOIDS, Internal and Protruding:

Objective: Obliteration of hemorrhoid by Electrolysis.

Basic Current: Direct.

Wave Form: Continuous.

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Negative pole. Special Hemorrhoidal Needles, with suitable handle, inserted in Hemorrhoid.

Dispersive Electrode: Positive Pole, 6"x8" wet pad under the buttocks.

Duration: 12 to 15 milliamperes - taking one full minute to advance current from zero to maximum - until hemorrhoid turns dark blue. Allow 3 day interval between treatment of adjacent hemorrhoids.

Comment: Needle is inserted about 1/16" beneath the mucous membrane and must not perforate the opposite side of point of entrance. Needle is held firmly with its hilt pressing against mucous membrane to prevent escape of hydrogen gas formation.

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HYPERTRICHOSIS (Superfluous Hair)

Objective: Permanent removal of unwanted hair through destruction of hair follicle by Electrolysis.

Basic Current: Direct.

Wave Form: Continuous

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Negative pole. Special Electrolysis Needles, in suitable holder, inserted along hair shaft to reach follicle.

Dispersive Electrode: Positive pole. 5"x7" wet pad under patient's hand, or glass bowl of water with a contacting strip (See Page 13, "Low Voltage Therapy") into which the patient may dip or remove the hand as instructed by the operator.

Duration: 1 milliampere for 1 minute or until hair grasped by tweezers slides out easily.

HYPERTRICHOSIS (continued)

Comment: Contiguous hairs should not be removed at one sitting. Usually not more than 4 or 5 hairs are removed at one time from a dime sized skin area.

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LUMBAGO

Objective: Relief of muscle spasm through sedation and inhibition through contraction.

Basic Current: 1st stage, Direct.
2nd stage, Alternating, 2000 to 2500 cycles per second frequency.

Wave Form: 1st stage, Continuous.
2nd stage, Surging.

Rate of Impulse: 1st stage, none. Inoperative on continuous wave form.
2nd stage, 20 to 25 surges per minute.

Active Electrode: 1st stage, Positive pole. 3"x3" wet pad over lumbar plexus (belly of psoas muscle).
2nd stage, same.

Dispersive Electrode: 1st stage, Negative pole. 6"x8" wet pad over sacrum.
2nd stage, same.

Duration: 1st stage, 10 to 15 minutes with 10 to 15 milliamperes.
2nd stage, 10 minutes of graded contractions, beginning with mild and increasing to vigorous. Treatment may be repeated daily if required.

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METATARSALGIA

Refer to "Pronation" for detailed Technic.

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MYOSITIS

Objective: Relief of pain and diminution of inflammatory process through vasodilatation.

Refer to "Bursitis" for detailed technic.

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NAEVUS

Refer to "Verucca" for detailed Technic.

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NEURALGIA

Refer to "Neuritis" for detailed Technic.

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NEURITIS

Objective: Sedation of pain and diminution of inflammatory process by pH influence.

Brachial

Basic Current: 1st stage, Direct.
2nd stage, Alternating, 2500 cycles per second frequency.

Wave Form: 1st stage, Continuous.
2nd stage, Pulsing.

Rate of Impulse: 1st stage, none. Inoperative on continuous wave form.
2nd stage, 4 or 5 pulses per second.

Active Electrode: 1st stage, Positive pole. 3"x3" wet pad over brachial plexus.
2nd stage, same.

Dispersive Electrode: 1st stage, Negative pole. 5"x7" wet pad under palmar surface of the hand.
2nd stage, same.

Duration: 1st stage, 10 to 15 minutes with 10 to 15 milliamperes.
2nd stage, 10 minutes of graded contractions progressing from mild to vigorous according to tolerance of patient. Treatment may be repeated daily if required.

Sciatic

Comment: Sciatica is treated in exactly the same manner with the exception that the Active electrode is placed over the sciatic notch and the dispersive electrode on the sole of the foot. If the manifestation is mainly in the lower leg, the active electrode may be placed in the popliteal space.

ENDOMETRITIS (continued)

Duration: 10 minutes with 5 to 10 milliamperes each week or 10 days. BE SURE TO REVERSE POLARITY FOR 2 OR 3 MINUTES BEFORE ATTEMPTING WITHDRAWAL OF THE INTRA-UTERINE ELECTRODE!

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FIBROSIS

Refer to "Ankylosis, Fibrous" for detailed Technic.

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FLAT FOOT

Refer to "Pronation" for detailed Technic.

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FRACTURES

Refer to "Sprains, Strains" for detailed Technic.

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FUNGUS INFECTIONS

Objective: Arrest of infection by ion transfer of copper. (Pereyra suggests 5% solution bis cupric sulfate - trimethylenediamino - with Aerosol MA added to inhibit binding of copper by tissue proteins.)

Basic Current: Direct.

Wave Form: Continuous.

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Positive pole, immersion method. See "Comment".

Dispersive Electrode; Negative pole. 8"x10" wet pad on torso at terminal of extremity.

Duration: 15 to 20 minutes with current equivalent to 2 to 3 milliamperes per square inch of active electrode area.

Comment: See Page 11, "Low Voltage Therapy" for details covering the preparation of electrodes for the local or immersion methods.

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PARALYSIS (continued)

Comment: Testing of the paralyzed muscle with both Direct current and Alternating current of various frequencies and with both Surging and Pulsing wave forms will reveal which combination induces the most vigorous contraction with the least amount of current. This will depend largely upon the degree of paralysis. Treatment is then to be carried on with this current combination.

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PRONATION - Flat Foot

Objective: Contractile exercise to counteract muscular weakness contributing to pronation and falling of arches.

Basic Current: Alternating with 2000 to 2500 cycles per second frequency.

Wave Form: Surging.

Rate of Impulse: 20 to 30 surges per minute.

Active Electrode: 3" x 3" wet pad over motor point of tibialis anticus - outward aspect of tibia about 3" below the patella.

Dispersive Electrode: 6" x 8" wet pad under sole of the foot and contacting arch. Immersion method (See page 11, "Low Voltage Therapy") utensil filled with salt water may be used.

Duration: Beginning with 2 minutes of vigorous contractions, increase gradually in alternate day treatments to a total of 10 to 15 minutes.

Comment: Self-conducted corrective exercises in the home between treatments is recommended.

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RHEUMATISM

Refer to "Arthritis" for detailed Technic.

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SCIATICA

Refer to "Neuritis" for detailed Technic.

SPRAINS and STRAINS

Objective: Removal and resolution of the vascular and lymphatic exudates resulting from trauma of arterioles and lymph channels.

Basic Current: Alternating with 2500 cycle per second frequency.

Wave Form: Surging.

Rate of Impulse: 10 to 20 surges per minute.

Active Electrode: Muscle Testing electrode with small disc over motor points of muscles involved.

Dispersive Electrode: 4" x 6" wet pad over spinal nerve root of subject muscles motor nerve branches.

Duration: Beginning with 2 to 3 minutes of mild contractions, increase both duration and vigor gradually in daily treatments.

Comment: Osborne observes: "This 'massage' is physiologic in type, not possible to produce by hand."

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STRICTURE, Esophageal and Urethral

Objective: Destruction of constricting tissue by Electrolysis.

Basic Current: Direct.

Wave Form: Continuous.

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Negative pole. Special olive-type bare copper electrodes in graduated sizes on insulated handle contacting constricting tissue.

Dispersive Electrode: Positive pole. 6" x 8" wet pad under dorsal spinal area for Esophageal, lumbar spinal area for Urethral.

Duration: 3 to 5 milliamperes until olive slides through constricting band under gentle pressure.

Comment: The smallest size olive, which will not pass the constricting band, is used for the initial treatment followed by successively larger sizes at each subsequent treatment. Gentle pressure is maintained until olive slips through stricture. Repeat once weekly.

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TENOSYNOVÍTIS

Refer to "Bursitis" for detailed Technic.

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TORTICOLLIS, Trapezius (Wry Neck)

Treat as for "Lumbago" but with Active Electrode over motor point of trapezius (upper) muscle and Dispersive Electrode over upper dorsal spinal ares.

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ULCER, Indolent

Objective: Removel of waste products and improvement in nutrition by prolonged vasodilatation through ion transfer of "Mecholyl", 5% aqueous solution.

Basic Current: Direct.

Wave Form: Continuous.

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Positive pole. Locate above or below ulcerated area - NOT IN CONTACT WITH ULCER - to embrace area between active and dispersive electrodes. See "Comment".

Dispersive Electrode: Negative pole. 6"x8" wet pad, or immersion utensil, at any convenient remote point. See "Comment".

Duration: 5 to 10 minutes twice weekly, time being dependent upon amount of current used. (2 to 3 milliamperes per square inch of active electrode area is recommended.)

Comment: Refer to Page 11, "Low Voltage Therapy", for details covering the preparation of electrodes for local immersion methods.

Alternate

Objective: Sterilization of the lesion and stimulation of granulation through ion transfer of copper or zinc.

Basic Current: Direct.

Wave Form: Continuous.

UICER, Indolent (continued)

Rate of Impulse: None. Inoperative on continuous wave form.

Active Electrode: Positive pole. Gauze or cotton pad of sufficient size to cover the ulcer and a slight amount of contiguous healthy tissue. Back by a copper, zinc or block tin metal piece to conduct current. Saturate with 2% copper or zinc sulfate and place in direct contact with ulcerated area.

Dispersive Electrode: Negative pole, 6" x 8" wet pad placed at any convenient remote area.

Duration: 15 to 20 minutes dependent upon amount of current employed based on 2 to 3 milliamperes per square inch of active electrode area.

Comment: After sufficient treatment the surface of the ulcer will become discolored, green with copper or grayish-white with zinc. Treatment may be repeated twice weekly.

- - - - - - - -

VERRUCA (Warts)

Objective: Destruction of lesion by Electrolysis.

Basic Current: Direct.

Wave Form: Continuous.

Rate of Impulse: None, Inoperative on continuous wave form.

Active Electrode: Negative pole, Small steel needle in suitable insulated handle inserted vertically in center or "criss-cross" laterally through growth.

Dispersive Electrode: Positive pole. 6" x 8" wet pad at any convenient remote area.

Duration: 2 to 5 milliamperes for 1 to 3 minutes, or until hydrogen bubble appears at point of insertion or needle.

Comment: For small verrucae the needle inserted in the center and thrust vertically to the base of the lesion is sufficient. For larger lesions the needle may be thrust through the sides to create a pattern similar to wheel spokes in several applications.

* * * * * * * * * *

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344

MAY, 1923

Tongues in Trees,
Books in the Running Brooks,
Sermons in Stones
And Good in Everything.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. I MAY, 1923 No. 8

Editorial Comment



Home of Fischer's Magazine

Judging from the volume of correspondence received daily, by the friendly comment, the constructive criticism and the number of helpful suggestions offered, "*Fischer's Magazine*" is proving of exceptional interest.

This is our eighth issue—what do you think of it? Have we fulfilled our desire to make each succeeding issue of more therapeutic value than its predecessor?

We want more copy—we want to pass along every good idea that is submitted—we want to circulate original articles on the latest and best Physiotherapy technique.

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There are hundreds of doctors who are in exactly your position. Don't you think that some mighty valuable information could be exchanged if you had an opportunity of talking to each of them? Certainly, time and expense would not permit this, but, without any cost to you we are attempting, through the medium of "*Fischer's Magazine*" to provide an excellent substitute.

Let us hear from you—everyone who reads this. Do not think that because you are achieving success along a certain line with Phsiotherapy treatments that such technique is common knowledge. Many of your brother physicians might just be looking for a similar idea.

SEND ON *YOUR* CONTRIBUTION, *NOW*.

Diathermy Suggestions

Dr. Elnora C. Folkmar, Washington. D. C.



Dosage in Diathermy is a thing that can be learned only by experience. In treating small areas with local diathermy, the number of milliamperes of current should never exceed 100 to each square inch of the active electrode. In most cases the comfort of the patient is the best guide.

The duration of a treatment will depend on the condition to be treated, as well as the patient. Treatments vary in duration from 5 minutes to 1 hour.

Frequency of treatment also depends on the condition to be treated and the ability of the patient to come for treatments. In most cases daily treatments are advisable at first, then thrice weekly, later twice, and then possibly once each week.

Diathermy is not a panacea for all diseases, yet its indications are many. It is a most excellent adjuvant to many other therapeutic measures, and in many cases it is the indicated therapeutic agent par excellence. For diathermy is heat, and heat only—and heat is necessary to life, to health, to function. Heat is necessary to repair in injury to the restorative processes when disease is present, and diathermy furnishes this needed heat where it is wanted, and when it is wanted, without taxing the heat regulating forces.

Electro-Coagulation of Tonsils

T. Howard Plank, M. D.



The reduction of hypertrophied tonsils as well as the destruction of badly diseased tonsils with high frequency currents is more and more demanding the attention of the general practitioner who first sees the vast majority of these cases. When one considers the growing antipathy toward their removal by surgical means there is increasing need of investigating other methods of treatment.

It is a bloodless operation that can be performed in one's office and requires but a few minutes. The pain occasioned by the treatment can be controlled by any good local anesthetic. The writer uses a two percent of all except Butyn which can be used as low as one-fifth of one percent and all without danger of toxic effects if cocaine is omitted from the list as it should be. The local anesthetic should be injected into the tonsil as well as the peritonsillar tissues.

All tonsils needing treatment can be taken care of with the high frequency currents. This includes everything from the simple hypertrophy, the repeatedly infected, inflamed tonsils, those badly diseased and abscessed, to the malignant tonsils, and it makes no difference whether the malignancy is of the sarcomatous or carcinomatous type providing the diseased tissues are electro-coagulated. It makes no difference whether the tonsils are acutely infected or long since chronically so. The high frequency treatment of badly infected tonsils need not be delayed until the infection can be abated by some other means as it is sometimes necessary to do before cutting operations.

Hospitalization of the patient is unnecessary as it is purely an office treatment excepting malignancies. Preoperative sterilization of the throat is wholly unnecessary as the current does that by the best method known to the world

today—excessive heat. Post-operative sterilization is best accomplished by the use of actinic rays from a water-cooled, quartz-mercury lamp. All bacteria are killed by a temperature above 160 degrees F. and one has no trouble raising the temperature of the tonsil to 212 degrees F or higher.

The treatment by electro-coagulation with high frequency currents is bloodless, hence there is no need of hemostasis or hemostatics. The only articles needed besides the machine (which for this work should have a capacity of about 1000 milliamperes) will be a pair of good flexible conducting cords with sufficient insulation to prevent leakage of the current and of sufficient length to reach the patient easily, a good foot switch for the direct control of the current by the operator, a good hard-rubber handle of convenient size and length capable of holding a pliable needle of sufficient length to reach the tonsil without effort, and a wooden tongue depressor. If the tonsil is hidden behind the anterior pillar, a blunt hook or retractor will be needed so an assistant can hold the pillar out of the line of vision and away from the current. Any non-conduction material can be used for the depression of the tongue. If it is desirable to insulate the needle, it is easily accomplished by slipping small rubber tubing over it, covering all but the distal inch which should be as sharply pointed as it is convenient to handle.

The actual treatment is as follows: anesthetize the tonsil and peritonsillar tissues; set the high frequency machine to deliver about 300 milliamperes of D'Arsonval current which is sufficient for simple hypertrophies (use about 600 milliamperes if destruction is desired); have the patient sitting where a good light can be thrown into the throat; have the foot switch at a convenient distance; have one pole of the current going to the patient's hands (an auto-condensation handle is best for this). Now with your needle-holder and tongue depressor you are ready for action. If mere reduction in size is wanted, lay the needle on the tonsil and step on the foot-switch, watching carefully the action on the tissues, and as soon as the tissues commence to blanch stop and move

the needle to a new area and proceed as above until all areas are equally treated, at which time the patient is ready to go about his regular duties.

However, if you wish to destroy the tonsil, use the stronger current and insert the needle into the tonsil tissue about one-fourth inch, then proceed as before, again watching for the blanched appearance which will take a slightly longer time (a few seconds only), and will mean that the tissue around the point of the needle has been coagulated and destroyed. Now reinsert the needle into a new area and continue until the desired destruction has been accomplished and again your patient can go about his daily occupation.

The destroyed tissue will come away in about ten days, of its own accord. Do not attempt forcible removal or you will start bleeding. One treatment is usually sufficient; however, if not, another can be given a month later. The actual working time for both tonsils should not be over five minutes.

1612 Heyworth Building

□ □ □

From 12 to 14 years have been added to the average human life in the last half century, due to the progress of medical science. But 600,000 persons still die in the United States annually from preventable diseases.

□ □ □

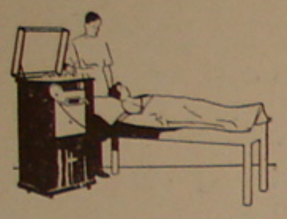
When the question of supplies and accessories comes up—just write FISCHER. Put your dependence where you know you may.

□ □ □

The denial of the employment of physical measures to those who suffer is sustenance to the quack. The adoption of these measures by the medical profession will do more than anything else toward driving the isms out of the practice of medicine.

Diathermy in Pneumonia—a Report of Ten Cases

By Harry Eaton Stewart, M. D., New Haven, Conn.
Consultant in Physiotherapy, U. S. Public Health Service



These cases are from my consulting service in the U. S. Marine Hospital, No. 21, New York, reported by permission of Col. George B. Young, Medical Officer in Charge. There have been reported heretofore a number of cases of pneumonia, treated by diathermy. In most, if not all, of these cases there was lacking the laboratory reports,clinical records, etc., which largely obviated these reports being accepted at their face value. You do not need to be reminded of the extreme caution that must be exercised in accepting any treatment as specific in this disease, which varies so greatly in type and mortality in different seasonal epidemics.

Diathermy is a form of conversive heat, generated deep in the tissues between the poles of the D'Arsonval type of high frequency current. The machine used was of the portable type, capable of delivering up to 2500 milliamperes of current.

The current was turned on slowly, the rheostat slowly advanced until a maximum of 2000 milliamperes was reached in about four minutes. This was continued for twenty minutes and slowly cut down in about two minutes.

There are at least eleven different and distinct techniques in the use of diathermy. The technique used in all of these cases is the through and through bipolar method, with flexible composition metal plates, about 4x7 inches, placed directly over the affected lobes anteriorally and posteriorally. A hot shaving soap lather was applied to the skin and electrodes. The patient lay on the posterior electrode, supported by a pillow, the anterior one was held gently, but

firmly, on the chest wall. The enthusiastic cooperation of the hospital staff aided greatly in carrying out this study. The physical findings in each case were made by the Ward Surgeons, Dr. Trimmer and Dr. Boland, and the Chief of the Medical Service, Major Bryan. The X-rays were taken in the hospital laboratory. The laboratory findings were made by the chief of that service, Dr. Taylor, and the only function of the Department of Physiotherapy was to give the treatments. The head aide, Miss Cargill, gave all the treatments personally. The cases selected were nearly all those, which in the opinion of the Medical Chief, were in an extremely critical condition. Complete physical and laboratory findings in each case I have here if any of you are interested in looking them over. A complete reading of them would extend the time far beyond that allowed for the paper. I will, however, read a brief summary of each case.

Case I. G. L., 39, white, merchant seaman. Family history: one brother died of tuberculosis. Past history: negative.
The patient was admitted to the hospital January 7, 1922, and had a chill that evening.
Physical findings showed congestion of entire left lung, a few scattered râles on the right, otherwise negative. Sputum showed streptococcii, no pneumonocci.
X-ray examination: showed the entire left chest dense and heart displaced to the right, suggestive of fluid. Tapped twice, no fluid obtained.
Diagnosis: *Lobar pneumonia*. On the 5th day of the disease, patient's condition very bad, the relatives were notified. *Diathermy* was started in hope that it might help him. Temperature started down by lysis immediately after treatment. Treatment was continued twice a day for six days and then once a day. The most striking thing about this case was the immediate relief of pain and distress, and the improvement in the circulation. He apparently began to improve steadily from the first treatment and has made an uninterrupted recovery.

(Continued on page 10)

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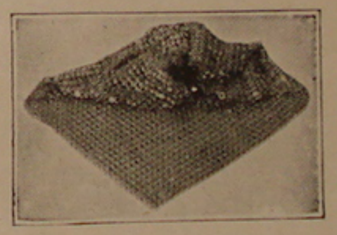
Flexible Mesh Diathermy Electrodes

(Patent applied for)

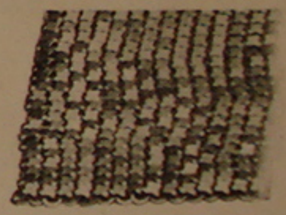
The most flexible *all-metal* electrode ever designed. Fits any part of the body like a glove. May be employed in connection with Diathermy, Electro-coagulation, D'Arsonval Auto-condensation, Sinusoidal, Galvanic or any electrical modality where perfect contact on the skin is necessary. Composed of a series of flat links of German silver. Especially recommended for use in Diathermy treatments. Use it on

The Knee and Elbow, over the Shoulder, On the Back, the Wrist and Hand, Wherever it is difficult to form a Perfect Electrical Contact with any Other Means.

Endorsed by the best known Physiotherapists everywhere. Try a piece on a difficult case and you will use it to the exclusion of all other methods. A heavy soap lather is employed as a conducting medium between the metal and the epidermis.



A Mesh Electrode



Section of Electrode showing exact size of links.

Furnished in Five Widths. Code	Price per lineal inch
Cat. No. 844— 6 inches wide SAFROL	$0.30
Cat. No. 870— 8 inches wide SAGGER	.40
Cat. No. 871—10 inches wide SAGUMS	.50
Cat. No. 872—12 inches wide SAILER	.60
Cat. No. 873—15 inches wide SAKIEH	.75

(Advertisement)

Case II. C. M., 24, white, merchant seaman. History: entered hospital January 24th. Complained of headache, sore throat, and pain in extremities. Pain in right chest. Temperature 103°. Pulse 112°. Respiration 24.
Physical examination: tonsils slightly enlarged and reddened. Heart normal. Lungs, to-and-fro friction rub at left base posterially. A few fine crepitant râles at angle of left scapula, otherwise negative. Sharp variations of temperature for two days, simuated malaria. Two blood smears negative. Wasserman *four plus*. Urine negative. *January 27th*, area over chest below right scapula over which the percussion note was dull. Broncho-vesicular breathing, with numerous fine crepitant râles. Diagnosis: Broncho pneumonia.
X-ray examination: January 28th. Increased density, lower lobe of right lung.
Diathermy began on the 28th and continued daily. Temperature dropped permanently on the 29th and he made an uninterrupted recovery. X-ray, January 31st, three days after the first one showed marked clearing in the involved area of the right lung. Marked relief varying from two to four hours followed each application of diathermy, noted by the nurse and the ward surgeon.

Case III. A. H., 37, white, merchant seaman. Family history: negative. Present illness: admitted hospital January 19th. Two days before entering had a severe chill, pain in extremities and back and headache. Extreme prostration and cough. On entering the hospital temperature was 101°, which rose to 104° within seven hours.
Physical examination: heart normal. Coarse bubbling râles over both bronchi, a dullness over base of the left lung. Breath sounds harsh through entire left lung. *January 21st*, patient's condition much worse, pulse 136, and thready, respiration 44 and labored. Chest showed well developed lobar pneumonia at right base and pleurisy with effusions at the left base, W. B. C. 46,000, 82% polys. *Diathermy* applied three times, twice during day and once at night on

the 21st. Patient showed temporary improvement that was marked. On the 22nd, the patient developed hemorrhagic rash on the back and upper extremities. General condition, critical. Patient died on the 22nd, 8 P. M. Blood culture 18 hrs. incubation showed streptococcus veridans septicemia.
Autopsy: lobar pneumonia on the right, central pneumonia on the left, pleurisy with effusions on the left, septicemia. In the pleura an exudate about 1-8th inch thick, which covered the pleura.

Case IV. W. S., 19, white, merchant seaman.
History: had a chill day before entering hospital. Admitted January 19th. Temperature 104°, pulse 105, respiration 36. Acutely ill.
Physical signs: percussion note dull over area below left scapula. Fremitus increased. Distinct broncho vesicular breathing with a few fine crepitant râles. January 20th. Examination showed clear-cut lobar pneumonia. Left lower lobe. Sputum examination. Pneumococci type 4. Wasserman negative. White cell count 28,600, 78% polys.
Diathermy began on the 22nd and repeated twice daily. Patient was delirious from the 21st to the 23rd. Temperature fell by lysis, recovery was uninterrupted.

Case V. E. R., 26, white, merchant seaman.
History: admitted February 3, 1922. Taken with frontal headache, weakness, severe pain in left chest the previous day. Pain on inspiration or coughing.
Examination: Throat negative, chest, left base posteriorally a loud friction rub. Harsh breathing over both bases. Given mustard plaster, aspirin gr. 10 q.4 h. and amon. carb. and cod. p.r.n.
The next day left base gave bronchial breathing whispered pectoriloquy and dullness almost flat.
Diagnosis: *Lobar pneumonia.* Type IV pneumococcus.
Diathermy started twice daily which lessened pain. On the 7th the right middle lobe became involved and real double

pneumonia developed. On this day condition reported desperate, patient "filling up." Greatly improved by two diathermy treatments three hours apart and temperature began to come down by lysis reaching, normal on the 10th.

Case VI. G. S., 32, white male, merchant seaman.
History: had chill and became ill two days ago. Admitted February 13th, 1922.
Examination: chest showed patch of consolidation below right scapula. Bronchial breathing.
Diagnosis: *Lobar Pneumonia.* Type IV (February 15th.)
Diathermy twice daily with improved symptoms and fall of temperature by lysis.
Lab. *Urine* negative for albumen or sugar.
X-ray of chest showed mottling and fibrosis of right lung suspicious of T. B.
Sputum negative for T. B. Pneumoccus Type IV.
Blood w.b.c. 21,200, 82% polys.
Temperature reached nearly to normal February 18th. Diathermy discontinued.
March 3rd. Left lung became involved. Many râles in right base still.
Diathermy twice daily. Irrational two days with high fever which returned to normal on the 8th and 9th, followed by rapid recovery.

Case VII. J. R., 37, white male, merchant seaman.
History: very ill for several days. Admitted Feb. 16th, 1922.
Examination: right base flat, bronchial breathing. Patient cyanotic, pulse 120. Temperature 103.4. Prune juice sputum.
Diagnosis: Feb. 17. *Lobar pneumonia:* Sputum Type IV pneumococcus.
Diathermy twice daily begun at once.
Temperature started down immediately by lysis, with general improvement.
Urine Sp. Gr. 1027 Alb. trace pus present.
X-ray upper right lobe dense.
Sputum negative for T. B.
Made a slow uninterrupted recovery.

Case VIII. O. Y., 28, mongolian male, foreign seaman.
History: felt ill three days before admission on Feb. 22, 1922.
Examination: chest shows râles and harshness throughout. Cardiac mitral murmur. Left base harshness and bronchial breathing.
Diagnosis: *Lobar pneumonia.* Type undetermined. *Diathermy* twice daily. Lab. reports: blood hemoglobin 100%, white blood cor. 10,000. Wasserman, Neg.
Temperature started down by lysis after the first diathermy treatment. Recovery rapid.

Case IX. A. H. B., 31, white male, merchant seaman.
History: acutely ill four days before admission Feb. 23, 1922.
Examination: scattered râles and harsh respiration throughout chest. Pulse 96, Resp. 36, temperature 105. Dyspnoeic and cyanotic. Suspected influenza. Feb. 25 developed dullness in right base with bronchial breathing. Cyanosis more marked. Resp. 40 and shallow. Pulse 112.
Diagnosis: *Lobar pneumonia. Diathermy* twice daily. Lab. no virulent pneumococci. Blood hemoglobin 75%, w. b. c. 10,000.
Feb. 26: heart enlarged to left. Mitral systolic murmur. Patient irrational. Temperature came down by lysis after the first diathermy treatment. Recovery rapid and uneventful.

Case X. W. McD., 52 white, male, merchant seaman.
History: slightly ill for two days. Admitted March 4.
Examination: right chest anteriorly shows dullness, prolonged respiratory note. Friction rub posteriorly with a few râles.
March 6th: dullness increased at right base, vocal fremitus bronchial breathing.
Diagnosis: *Lobar pneumonia. Diathermy* started twice daily to March 13th with steady improvement in all symptoms and temperature drop by lysis. Lab: *Urine* Sp. gr. 1023. Sugar negative. Albumen trace. *Sputum*, unsatisfactory for typing.

March 15: much improved, diathermy once daily. Recovery rapid and uneventful.

Conclusions: The results in these cases are suggestive that diathermy may have an influence in hastening recovery in pneumonia. The evidence is not at all conclusive. In several of the cases the diathermy was not instituted until in favorable cases the temperature might be expected to start downward, but it is the opinion of the medical staff who selected these as test cases that diathermy helped in their recovery. When we have had many more cases to report on, we hope to be able to make a more definite statement, but this much we do know, that in *every single case* and in almost every single *treatment* the temporary effect upon the patients was remarkable. Cyanosis disappeared. The expiratory grunt when present was markedly lessened or stopped entirely. Respirations were less labored and the patient received from two to four hours of very marked relief, in many cases obtaining sound sleep. Now diathermy has been ordered as soon as the diagnosis is made in every case of pneumonia at the Marine Hospital.

It is not too much to assume that in many critical cases this marked relief of symptoms may be the turning point in disease. Under proper technique there is no danger of ill effects from two or even three diathermy treatments per day. The proper technique is of the greatest importance. The fall of temperature takes place by lysis where diathermy is used.

Pneumonia attacks all ages and the rugged as well as the weak. The death rate is so high that any method of treatment which will lessen it to any extent would be invaluable. The results of this work are sufficiently encouraging to justify the wider employment of diathermy in this disease.

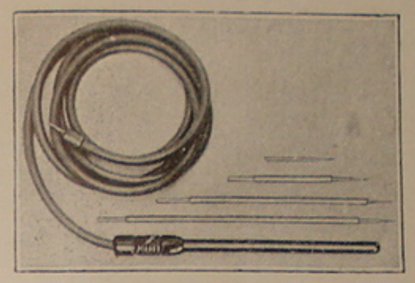
420 TEMPLE STREET.

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He who slurs physiotherapy strikes a blow at the house in which he lives.

A New Surgical Diathermy Electrode

Suggested by Dr. T. Howard Plank for electro-coagulation operations—especially tonsillectomies. It is small, very light in weight and exceptionally handy for this work. The operator's hands are out of the line of his vision, entirely, when making the application.



A very flexible rubber covered cable is securely fastened directly into the polished hard rubber handle, and is sufficiently insulated that it may be wound around the hand and arm, or allowed to lay against the face of the patient with absolutely no danger of shocking.

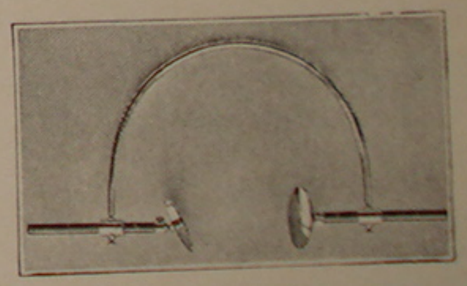
There is no exposed metal anywhere with the exception of the active tip. Four tips of different lengths are furnished as illustrated.

Catalog No. 862—Code SALLY—Price..... **$5.00**

Fischer Improved Diathermy Clamp

An aluminum casting, smoothly polished and light in weight, arranged to support two disc electrodes—one on each side.

The electrodes proper are supported on hard rubber handles which are adjustable to fit any size part to be treated. The discs are mounted on swivel ball joints, making the entire assembly a very convenient and useful device.



Catalog No. 867—Code SALTY. Price, complete.... **$12.00**

A PAGE OF FUN



Puzzle—Find the Frog

Absent-minded Professor: "I will now show you the internal structure of a frog—"

Same party, after opening a package disclosing a hamburger sandwich: "M-m-m I was sure I ate my lunch a few moments ago".

—Literary Digest.

□ □ □

She knows Him

Jack: "I think I have a cold or something in my head."
Genevieve: "Must be a cold".

□ □ □

The Inspired Compositor

There is one honest brokerage house. It advertises: "Let us place your name on our wailing list."

□ □ □

Sarcasm

Doctor: "You have been at death's door, and only your strong constitution has saved you."
Patient: "Remember that when you send in your bill."

De Mortius

"Took a walk through the cemetery today, and read the inscriptions on the tombstones."
"Well, what about it?"
"Was wondering where all the wicked people are buried."

□ □ □

More Apropos

The notice in the rooms of hotels which reads, "Have you left anything?" should be changed to "Have you anything left?"

—Detroit Motorist.

And so let us be Cheerful,
Without Regret for the Past,
With Contentment in the Present,
And with Strong Hope for the Future.

FISCHER'S MAGAZINE



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H. G. FISCHER & CO., Inc.

345

JUNE, 1923

What is a failure? It's only a spur
To a man who receives it right;
And it makes the spirit within him stir
To go in once more and fight.
If you never have failed, it's an even guess
You never have won a high success.

—Edmund Vance Cooke

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. I JUNE, 1923 No. 9

Progress

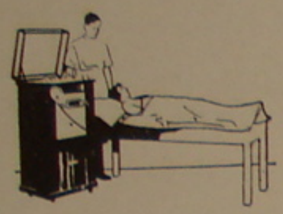
IT IS surprising what one can find when digging into past history. There are those even today who shun Electro-therapy as being "too new" and "untried," yet the editor has just come across an old set of patent papers, dated August 9th, 1859—64 years ago—taken out for Moses Marshall, of Lowell, Mass., calling for "An improved device for making Electro-Magnetic Currents" . . . "A new and useful machine for *curing* or ameliorating diseased persons, particularly those affected with nervous complaints."

What wonderful, progressive strides have been made in those 64 long years! Especially in Medical Electricity! Results that were undreamed of even 10 years ago are daily occurrences in the practice of Electro-physiotherapy today.

And, while on the subject of progress, are we sufficiently thankful—that we are permitted to live in this marvelous age; to see the constant development of worldly resources; in the midst of greater opportunities for doing good—than any generation heretofore? To see men fly through the air as birds, and go under the waters as fish; to take heat and power from the ground; and take electricity, the most potent factor of all, with incalculable power, from the air, and to be able to convert this wonderful element to the physical up-building of humanity?

Diathermy in Pneumonia

The Technic of Application



Excellent results have been achieved, and much written recently on the treatment of Pneumonia by Diathermy. The following is a clear and concise technic which has been approved by well known physiotherapists:

Two German silver mesh electrodes, each connected to one of the diathermy outlets on your machine, are applied posteriorly and anteriorly over the affected lobe. Electrodes should be 5″ by 6″ in size. If both lobes are involved, either use larger electrodes or apply the anterior mesh on the left side and the posterior on the right.

Use sufficient warm soap lather on the skin and under the mesh to insure perfect contact.

Start the treatment with not over 200 Milliamperes; after a minute increase slowly, allowing 5 minutes to reach the maximum of from 1800 to 2000 M.A. After 20 minutes of this maximum current gradually cut the M.A. down again to zero before cutting off, consuming about 3 minutes in the reduction.

It is advisable to treat twice or even three times daily.

Spread a padding under the back or use a thin soft pillow on which the mesh electrode is placed. The patient lies on this electrode, and perfect contact is obtained. The assistant should hold the anterior electrode in place, with only sufficient pressure to insure contact, being careful not to restrict the movements of respiration. Handle the patient gently.

The only contra-indication to the use of medical diathermy is the presence of pus without drainage.

□ □ □

From the mistakes of others a wise man corrects his own.

High Frequency Currents and Roentgenotherapy in Vesical Tumors

GUSTAV KOLISCHER, M.D. and HARRY KATZ, M.D., Chicago

The introduction by Beer of the high frequency spark in the treatment of vesical tumors was an impetus to the study of satisfactory methods for controlling such growths. Endovesical and transvesical application of the high frequency current was taken up with great enthusiasm by urologists, so that at present these forms of treatment are considered by a majority as the method of choice in tumors of the urinary bladder. Clinical experience, together with the teachings of modern biology and pathology, have helped to clear the field. In the application of high frequency currents one must distinguish between fulguration, the destruction of structures by the electric spark, and surgical diathermy, the killing of tissues without sparking by the heat produced through the resistance offered by the tissues to the current forced through them.

Fulguration may be applied by the endovesical route, the cystoscope with the attached carrying tube and active electrode being introduced through the urethra, while the inert electrode is placed on the back of the patient. The destruction of the tumor is accomplished without opening the viscus, the current used being of low voltage and amperage. This procedure is the method of choice in all presumably benign tumors whose location and size permit approach by the fulguration wire. Whether the spark is directed to the base or the crown of the growth will depend on the character of the papilloma. The quickest method of removing such an excrescence is to place the wire tip directly in the base of the

tumor. Thus the nourishing blood vessels are rapidly obliterated. In consequence, the growth shrivels immediately and the whole operation is finished in one step. This sort of fulguration is advantageously applicable only to the leaf shaped papillomas that have a constricted pedicle and are so transparent that the blood vessels running through them are easily seen.

However, in papillomas that carry a dendritic, bushy crown, the direct approach to the base may not only be difficult but also disadvantageous for other reasons. Even if one succeeds in placing the end of the wire into the base, the crown of the tumor is likely to drop over it, making it impossible to watch the effect of the spark. Then the pushing around of the crown may lead to the separation of intact particles, thus leading to multiple implantation of such fragments, whose inclination toward proliferation may eventually lead to a papillomatosis of the entire bladder. In all such instances it is advisable to start the coagulation from the top of the growth, bringing the active electrode successively in contact with various sectors of the crown.



Fig. 1.—Bladder exposed; transverse incision placed between the two suspension sutures.

Even if particles of the tumor are dispersed throughout the cavity of the bladder, these fragments are readily devitalized by the spark and unable to form an implant. As a rule, in such cases it will be necessary to make several applications at various sittings; but this disadvantage is outweighed by the safety of the procedure.

Endovesical fulguration must not be attempted if circulatory changes are observed around the base of the papilloma, though in all other particulars this growth may show the clinical signs of benignancy. These changes may be edema,

submucous blood patches, engorged and numerous blood vessels, or simply thickening and rigidity of the adjacent mucosa, which in such a case, as a rule, has lost its normal gloss. Then the application of the spark may involve pronounced danger. It must be remembered that the fulguration spark not only burns but also produces a mechanical effect, divulsing and comminuting the tissue it is brought to bear upon.

These circulatory disturbances may be due to inflammation subsequent to infection, or to malignant degeneration in and around the base of the tumor. In either case fulguration may be followed by untoward results. Infectious matter may be forced into the surrounding tissues, and severe pericystitis and even peritonitis may develop; in the case of malignancy, forced dissemination of malignant cells may result, which quite often leads to an explosive luxuriation, so that in a short time the whole pelvis becomes filled with cancerous masses.



Fig. 2.—Carbonization of arboraceous crown of tumor with multispiked electrode.

In all cases of the character mentioned and in all decidedly malignant instances, surgical diathermy, after the bladder has been opened, should be employed; that is, currents of higher tension and voltage are used. The details of administering the high frequency current will again be regulated by the features peculiar to the tumor under consideration. The leading requirements are simplification of the entire procedure, avoidance of implantation of tumor particles likely to luxuriate in the adjacent areas, and the delivery of a finished surgical product, thus making possible an early resumption of the natural functions and shortening the time of recovery, and at the same time satisfying the principal postulate, the avoidance of a relapse of malignancy.

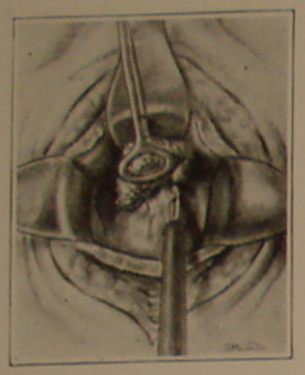


Fig. 3.—Elevation of tumor crown; severing of the pedicle by the galvanocautery.

Technic

We apply in vesical tumors solely the monopolar method. The inert electrode, a square of blocked tin, 20 by 10 cm., padded with gauze soaked in physiologic sodium chlorid solution, is placed under the hips of the patient, while the coagulation is carried out by a metallic electrode introduced into the opened bladder. Into the rectum a Barnes bag is inserted, and this is distended by 200 c.c. of water, raising the trigon and facilitating the clearance of the vesical base. The bladder is distended with 200 c.c. of a 2 per cent protargol solution. By the usual median abdominal incision, the anterior aspect of the bladder is exposed, and the reduplication of the peritoneum is stripped off by gauze dissection, exposing freely the outer anterior bladder wall. Then in the upper and lower angle of the wound two tension sutures are inserted which penetrate the bladder wall. The ends of the suture are secured by metal clamps, the weight of which helps to elevate the bladder, which in later stages makes the vesical cavity better accessible. Now the bladder is opened between these guy ropes by a transverse incision (Fig. 1). The transverse incision, while permitting free exposure of the vesical interior, offers the advantage of facilitating the suturing of the bladder wound and at the same time prevents oozing of urine into the cavum retzii, in case the suture line should give. Then in the upper and lower angle of the vesical incision a fiber retractor is inserted. As a rule, pulling in an occipitocaudal direction will suffice to give sufficient clearance; in the case of very large tumors, one or two lateral retractors may have to be added. If one encounters an arboraceous bushy tumor, an electrode carrying three or four spikes is chosen (Fig. 2); and, by raining a shower of heavy sparks all over the crown of the tumor, a superficial coagulation or carbonization is accomplished. This deals successfully with any hemorrhage present, prevents bleeding during the following steps, and at the same time does away with the danger of implantation, because even if tumor particles are broken off during the necessary manipulations, these crumbs are already devitalized. If the tumor is pedunculated, its seared top is seized with forceps and gently pulled upward. The exposed pedicle is now severed with a galvanocautery closely to its implantation (Fig. 3). The resulting stump and the immediately adjacent area are now coagulated with a stamp-shaped electrode to the desired depth (Fig. 4). If the tumor is dendritic, but rather sessile without a well defined pedicle, then the initial act of sparking is executed by means of a single spiked electrode. The sparks of this cover a lesser area than the multispiked one, but produce deeper penetration, so that the whole tumor mass is quickly reduced to a hard crust (incineration). This procedure is more in the nature of the original sideration. Then, the stamp-shaped electrode is applied again for the coagulation of the base, care being taken to include the whole visible and palpable area of malignant infiltration in the coagulation. The sideration and coagulation are carried on until a thoroughly dry scab results and no punctate oozing is to be seen. The scab is as a rule white, unless the tumor is very rich in blood, when it is black. Under no condition is the spike pushed into the tumor mass, for reasons explained above. Sessile infiltrating tumors are coagulated immediately with the stamp electrode without any previous sparking.

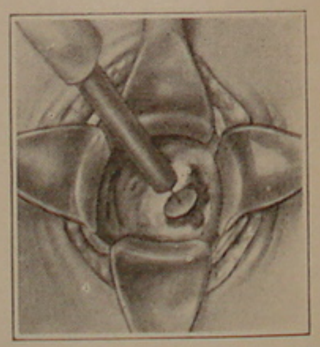


Fig. 4.—Coagulation of tumor base and concomitant sealing of adjacent lymphatics with the stamp-shaped electrode.

COMMENT

The extent of the coagulation and to what depth it ought to be carried out deserve some discussion. At first it was deemed necessary to coagulate the entire tumor mass in dealing with malignant growths. But experience covering immediate and remote results in bladder tumors and uterine cancers led to restrictions which, if applied, apparently improve the results in a striking way. If, for instance, a tumor, whether an indigenous vesical growth or a prostatic cancer that perforated into the bladder, involves the vesicorectal septum, a complete coagulation of this mass will produce a cloaca after the sloughing is finished. In addition to the distress caused to the patient, such a condition will almost invariably lead to general sepsis or to death by the development of a septic pyonephrosis. Therefore, in cases of this type the coagulation should penetrate the tumor only to a limited depth, while the remainder of it is left to the influence of roentgenotherapy.



Fig. 5.—Vesical incision closed by a mattress suture.

(Continued on page 10)

Elastic Bandage

We are always open to conviction—and when we were told that the Cotton Elastic (non-rubber) Bandage we advocated was not as good for Diathermy purposes as the more elastic material with the rubber, we investigated thoroughly.

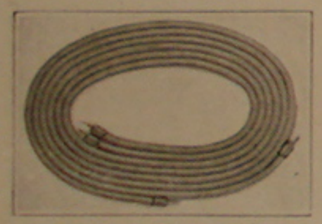
As a result we must admit that the Rubber Elastic Bandage is much superior. It binds the electrodes more firmly in place with less tension and consequently less interference with the blood stream. We are prepared to supply any amount of the 3-inch width.

Catalog No. 854—Code ELBAND—per yard, $.35

□ □ □

New Diathermy Cords

Diathermy Cords are constantly getting wet, and when covered with a mercerized or silk webbing they are usually a pretty sorry sight after using but a few days.



Here are some much improved Diathermy Cords covered only with pure gum rubber. They are very flexible, easily kept as clean as new, and constructed to last indefinitely.

Cat. No. 1130—Code NEGRO—
per 6 ft. pair.....$2.50

Bifurcated Diathermy Cords

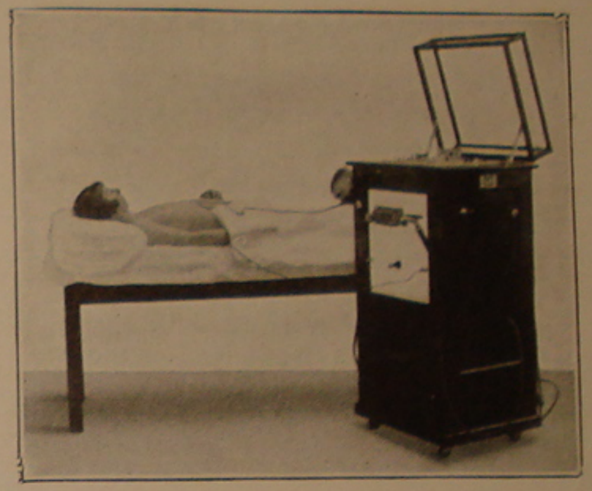
Made up in the same style and material as our No. 1330 cords, but with a 4 foot single length branching into two cords each 2 feet long.

Cat. No. 1332—Code SALIFY—each.....$2.00

□ □ □

Leaders in any endeavor are just ordinary persons with extraordinary determination.

Physiotherapy with Fischer Apparatus



Style "FO"

High Power Diathermy and Auto Condensation Outfit

The finest and most powerful outfit of its type that can be made. Compact, simple in operation, capable of the finest kind of results—and is securing such results daily in the offices of hundreds of busy physicians and surgeons.

Peculiarly desirable because of its extreme usefulness in such a wide variety of conditions, for which it affords a modern, ethical, efficient and time-saving method of treatment. Furnishes practically every modality used in electro-therapeutic work.

Cat. No. 1220.....$575.00

Advertisement

In case the latter should be successful, then the part of the tumor that replaced to a certain extent the septum will in course of time be replaced by fibrous tissue, thus avoid ing the formation of a cloaca. This procedure, originally instituted as the choice of the lesser evil, became under the weight of further experience the routine method. It was observed that roentgenotherapy following partial electrocoagulation yielded curative results that, in our experience, surpassed those previously accomplished by the employment of one of these methods alone. After the necessary electrocoagulation is completed, the bladder is mopped clean, care being taken to do all the sponging by dabbing and not by wiping, thus avoiding traumatism to the vulnerable vesical mucosa. Then the incision in the bladder is closed by catgut sutures inserted in such a way as to guarantee a broad apposition and avoidance of impaction of the mucosa into the suture line (Fig. 5). Over this suture a simple running suture is whipped to insure water tightness. Then the tension sutures supporting the abdominal wall are placed. Underneath these sutures a fine drainage tube, preferably a silver one, is placed, parallel to the incision and protruding at each end of it (Fig. 6). In this way perfect drainage is insured, and even in case of infection, sloughing of the fascia is prevented. Then fascia and cutis are closed in the usual way, and the guy ropes are tied.

The patient either begins to urinate naturally shortly after the operation, or, if unable to do so, is catheterized at regular intervals until the natural function is resumed. As a rule, the whole wound heals by first intention, and even if a slight breaking down should occur, the repair sets in quickly.



Fig. 6.—Drainage tube inserted underneath tension and suspension sutures; the fascia is closed over it.

The sloughing away of the diathermic scab takes from ten to sixteen days, according to the extent of the electrocoagulation obtained. On account of the varying intensity of the desiccation in the various sectors of the area subjected to diathermy, and the timely difference in the subsequently developing demarcating inflammation, the sloughing proceeds in the various areas with varying velocity. Therefore there are never large chunks of scabs thrown off at once, and the loosened shreds are further softened by the urine, and the sloughed particles are voided with the urinary stream. Beginning at the end of the first week after the operation as a matter of extreme precaution the bladder is regularly flushed with an antiseptic solution.

THEORETICAL CONSIDERATION

In explanation, the following theory may be offered: It is shown that, subsequent to electrocoagulation around the necrosed area, there is created a zone of reaction, or aseptic inflammation; there is not only an invasion of highly active cells, as round cells and lymphocytes, but the fibrous tissue becomes abundantly vascularized and fibroblasts appear. It may be safely assumed that intact cancer cells existing within this zone also fall under this influence. All roentgenologists agree that the more hyperemic a structure is and the more it returns to the juvenile stage, the better is the prognosis for the curative effect of the therapeutic rays. It may be suggested that under the action of the rays these energized cells produce materials which, in turn, act systemically to reduce the excessive multiplication of malignant cells. It therefore became our routine to coagulate malignant tumors to a restricted depth only, and to leave the remainder to roentgenotherapy.

CLINICAL EXPERIENCE

Out of twenty-seven cases of malignancy treated in the manner described two patients died: A woman died three days after the operation, with the symptoms of protein poisoning, evidently due to insufficient sealing of the lym-

phatics, permitting rapid absorption of débris; a man succumbed to a gas-producing bacillus infection in the abdominal wound, which became evident on the fourth day after the operation.

All the other patients, the oldest one being operated on more than three years ago, do not show any relapse or malignancy at the present date.

The exposure, opening and closing of the bladder, may be done under local anesthesia; for the coagulation, general anesthesia is preferable; the short duration of this manipulation reduces materially the danger of general anesthesia.

SUMMARY

It should be mentioned that any extensive electrocoagulation is, as a rule, followed by the development of a more or less intensive edema of the vesical mucosa. If of a high degree, it may be and actually has been mistaken by the inexperienced for a relapse. Careful and repeated cystoscopic examinations will clear the issue. Roentgenotherapy in massive doses is administered forty-eight hours after the operation, thus taking advantage of the perithermic reaction. Preoperative irradiation interferes with the reconstructive potencies of the tissues and prevents primary reunion. We have not seen any favorable results from the employment of radium needles, but frequently infection following their use has been observed.

The whole procedure is simple, practically bloodless, and of short duration. The primary mortality is considerably lower than that following resections or total extirpations of the bladder. The destruction of the tumor does not involve any reduction of the capacity of the bladder, which is one of the objectionable features of the cutting operation. The patient is not subjected to the dangers and misery of an abdominal drainage.

108 North State Street.

—*Abs. Jour. A. M. A.*

Physiotherapy in Acute Coryza

Leo C. Donnelly, M.D., Detroit

The following technic relieves the average case of acute Coryza:

Both anterior nares are first rayed with the Kromayer Lamp using the nasal holder. Then the nostrils are blanched with a one to one thousand adrenalin solution containing two per cent cocaine. A short quartz rod and a curved nasal quartz rod are then used in turn in each nostril, sterilizing both nostrils.

The tonsils and naso pharynx in turn are rayed with the Kromayer Lamp, using a hollow tubular applicator, and while doing this local work the essentials of quartz and radiant therapy are explained. At the completion of the treatment the patient is given a general bodily Alpine treatment with a larger dose over the head and chest, to build up the general resistance.

Following the general Alpine treatment a Deep Therapy Radiant Lamp with a blue globe is used over the face and upper chest for thirty or more minutes, bringing the Lamp as close to the patient as is consistent with comfort.

The couch on which the patient lies is equipped with a large, heavy auto-condensation pad over which are placed two woolen blankets and a clean sheet. A German silver mesh electrode, eight by ten inches, is placed over the patient's chest, which is held in place with a sandbag.

This mesh electrode and the auto-condensation pad are connected to the Fischer "FO" Machine. A general diathermy treatment is now given, lasting from fifteen to thirty minutes, using from 500 to 1000 Milliamperes of current, according to the patient. Your patient is now receiving a general diathermy treatment.

A glass nasal vacuum electrode (Fischer No. 4) is held in the operator's right hand; the left hand is placed on the patient's

forehead; the vacuum tube is then passed gently into the nostril, the left hand is removed from the patient's forehead, allowing the high frequency current to short through this tube and ground through the operator's body. The electrode is gradually worked deep into the nostrils, and generally it will pass back to the pharynx. This application is then repeated in the other nostril.

This technic generally aborts or cures a Coryza. If the patient is constipated, the sine current from the Morse Wave Generator insures a good bowel movement; use cam 3 for a new patient and cam 4 for an old patient. Urge drinking a great deal of water or hot lemonade during the day to insure washing out the poison which is turned loose with these treatments.

This method is entirely drugless, but if your patient wishes drugs they may be prescribed. If necessary, the treatment may be repeated, but in the majority of cases once is sufficient.

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Dr. L. C. Donnelly, also says, in speaking of the benefits of quartz light therapy in pelvic inflammation: "In pelvic inflammation, as in most diseases, the battle rages between the resistance of the patient and the virulence of the infecting organism. In either case, Quartz Light therapy is of proven value. . . . . Improvement in general symptoms may be immediately noticed.

Material benefit, however, is noted week by week rather than day by day. With sick people, evolution is better than revolution. Slow, steady progress is better than rapid recovery with relapses. Quartz Light therapy brings about the recovery by sterilizing germs, breaking down toxins, increasing elimination, normalizing white blood cell count, increasing the amount of red blood cells and haemoglobin, in fact so aiding metabolism that a condition approaching normalcy is brought about."

Our Mailing Department



We don't want to toot our horn just to make a noise, but we feel that our Magazine which comes to you so regularly does not always carry with it the sense of importance that it bears when it leaves our mailing department.

The difficulty and magnitude of the work required to edit, publish and mail 13,000 FISCHER'S MAGAZINES every 30 days is rarely appreciated by the average physician receiving but a single copy.

Are you giving FISCHER'S MAGAZINE its proper place in your library?

Are you keeping the copies for future reference, and last, but not least, are you contributing YOUR share of "copy"?

A PAGE OF FUN



Thanks, Doc.

A farmer rushed up to the home of a doctor in the village late one night, and asked him to come at once to a distant farm house. The doctor hitched up his horse and they drove furiously to the farmer's home. On arrival the farmer asked "How much is your fee, doctor?"
"Three dollars," came the surprised answer.
"Here you are," handing over the money, "That blamed liveryman wanted five dollars to drive me home."

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Sympathy?

Tommy was in the dentist's office, and the dentist had just finished extracting a tooth.

"Doctor," said Tommy, "The tooth next to that one aches, too."

"Yes," replied the doctor, "It aches in sympathy."

"Yank it out," commanded Tommy, "Darn such sympathy."

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Pa and the Boy

"Willie, your master's report of your work is very bad. Do you know that when Warren G. Harding was your age he was head of the school?"

"Yes, Pa, and when he was your age he was President of the United States."

Page Dr. Coué

"Fred's been glum since he was arrested for autosuggestion."
"Autosuggestion?"
"Yes, he asked a girl to go riding."
—Wisconsin Octopus.

□ □ □

Golfers—Warning!

She: "I'm just waiting for my husband to complain about my extravagance this month."
Her Neighbor: "Ready to give him an argument, eh?"
She: "You bet I am! By mistake his golf club checks came to the house, and I've got 'em."

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Growing Fast

"How old are you, Marjorie?"
"I'm five, and mother says if I'm good and eat lots of oatmeal, I'll be six next birthday."

**So, what signifies wishing
and hoping for better times?
We may make these times better
if we bestir ourselves.**

—Benjamin Franklin

FISCHER'S MAGAZINE

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346

JULY, 1923

ALL THINGS COME TO
THE OTHER FELLOW
IF YOU
SIT DOWN AND WAIT.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. I JULY, 1923 No. 10

Confidence

ACCORDING to Webster: "Trust; state of feeling sure; belief; that in which faith is put or reliance had."

A much maligned word, truly—about on a par with "service."

Yet one must have *confidence* in one's self and in the intimate surroundings of his own particular little world if he is to enjoy well founded satisfaction.

True thinkers certainly require convincement, and generally some amount of persuasion before forming definite conclusions, be the subject what it may.

There are others, and they form a lamentably large class, who prefer to ridicule and criticise instead of investigating—who underestimate and minimize every new thought or departure from the conventional paths.

But what greater *confidence* can there be shown to compare with that exhibited by the modern investigating thinker, the up-to-the-minute physician or surgeon employing Fischer Physiotherapy Apparatus? Their *confidence* is many fold: first, in themselves; second, in the manufacturer; third, in the quality of the goods; fourth, in the efficiency of the apparatus; and last, but not least, in the almost guaranteed results to be derived; all of which *confidence* is indicated in the unprecedented sales of Fischer Diathermy Outfits!

We are adding many to our list of friends every day—more physicians are dealing with, and obtaining satisfaction from, the House of Fischer, "that in which faith is put, or reliance had."

Dysmenorrhoea

CHAS. L. MULLINS, M. D.

Most cases of dysmenorrhoea that I have seen during my thirty-two years of practice, have been in young girls and in young women. Most of these have impressed me as being mechanical in their causation, angulated cervices, or defective development. Where the painful periods are due to angulation, I formerly tried all the various methods in use. Forcible dilatation under anesthesia usually afforded relief for from two to six periods, when the pain gradually returned, and upon re-examination I would find the angulation as before the dilatation.

Since I have been using some of the electrical modalities, I have tried out the method of using a dilator electrode, using different sizes—Galvanic current, negative pole attached to dilator and positive pole to large pad on lower abdomen. Not more than three to five milliamperes should be used, as it is desirable to avoid any caustic or burning effect, as scar tissue is the last thing we desire.

In some of these cases we have what appears like scar tissue at the point of angulation. I turn the current on gently after the tip of the electrode is introduced into the cervix and then make gentle but continuous pressure. The cervix will be felt to gradually yield as if either relaxing or softening. Some of the cases have required several attempts before I could get through the internal os with the smallest dilator.

By repeated treatments one can use the next larger size until finally the largest size goes through. In this class of cases painful periods are entirely relieved. There is a tendency for the condition to recur, and it is altogether advisable to tell the parents of this tendency and instruct them that even after the periods become painless and after the largest dilating electrode can be introduced, that these cases should have two or three treatments between periods for a few onths.

No great force should be used, but continuous gentle force while the current is on. Cut off the current before removing the electrode. When the electrode goes through the internal os is easily determined by the loss of resistance. Getting the vagina dilated so as to use the speculum is really the most disagreeable part of this treatment in young girls. It is surprising to see how some of these cases, run down and worn, would build up after the treatment, gain flesh and strength and a good color.

In the class of cases due to defective development, we have a different problem. The negative current will soften tissues and determine a greater blood supply to the part upon which the negative pole acts. Hence the good prospect of success in these defective development cases if seen early and treated persistently; not expecting too much in a short time, not too frequent treatments and not too strong currents; but using dilating electrodes not only to convey the current to the uterus but to dilate and help develop the cervix uteri.

Of course the physician should not forget that *he is a physician*, and must use all other proper means of building up his patients, for these defective development cases are usually of poor general physique. This method sometimes replaces and often supplements other kinds of treatments.

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From Dr. Grover's Column

The new metal mesh electrode fits all contours of surface and when held in place with a bandage, electrical contact is assured.

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Physiotherapeutic measures which conducted us safely through the most critical stage of the late war should be remembered with approbation.

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An autocondensation dose of 300-600 milliamperes should never be exceeded in cardiovascular disease.

Hypertension

Dr. N. M. Meals, Callensburg, Pa., writes: "With my physiotherapy apparatus I have materially aided many cases of rheumatism. Cases of Hypertension, and Hypotension, if the heart is reasonably good, can be greatly benefited and their lives prolonged. I will give you two case reports: "Case 1—Miss C., age 17, had scarlet fever in December, 1920. February 18th she came to my office, and on examination made diagnosis of Acute Bright's disease. The urine was at least 30 per cent albumin. Technic of treatment: patient was placed on the auto-condensation pad and given the D'Arsonval current for 20 minutes each day, for one week—600 to 1000 Milliamperes being employed.

"Then the treatments were given twice a week for two weeks longer, after which there was no albumin to be found. Patient was discharged as symptomatically cured. Two months later she was married, and I have not heard from her since.

"Case 2—A young man, about 28 years old, came to my office in 1921. After thorough examination I made diagnosis of Bright's disease. Treatment technic same as in case No. 1: about 800 milliamperes D'Arsonval current each day for a week; then twice a week for three weeks longer. Discharged as symptomatically cured.

"As you have said, Diathermy is a current that has been misused and much neglected. I believe in the standardization of Medicine, Serums, Surgery, Organotherapy and Zonetherapy. I use any one of these modes of therapeutics that is indicated in the treatment of disease. Some of our medical brethren throw cold water on Physiotherapy—and why? Because of downright ignorance, or a want of investigation as the case may be. I would not, and could not practice medicine without Electro-Physiotherapy."

□ □ □

Ask any doctor who uses Diathermy.

The Fischer Company Booths at Frisco



Voted one of the finest Exhibits at the A. M. A. Meeting, June 25th to 29th, 1923

Exceptional interest was manifest around the splendid Fischer booths due to the new features which have been added to our apparatus. Everybody seemed intensely eager to know all about the latest Diathermy and Electro-coagulation methods.

Tonsil Coagulation easily led all other subjects in point of interest—in fact, the eagerness of the physicians to absorb as much information as possible kept six of our men constantly on the jump, and the 6 o'clock gong at closing time was welcome music each day.

We expect to have another splendid article on Tonsil Removal in our August number. Watch for it.

Electro-Coagulation Treatment of Hemorrhoids

W. McCABE, M. D., Chicago

Hemorrhoids may be successfully treated in the physician's office, and thus save the patient the usual hospital expense and loss of time. Most patients have a dread of the hospital, and especially any reference to an "operation."

Technic

Place your patient on a table on his left side, with the left leg stretched straight out and the right knee flexed and resting on a pillow.

Apply a strip of adhesive tape, about 2 inches wide and 7 inches long, on buttocks on line with and about an inch and one half from the anus on each limb. Fasten gauze bandage to ends of adhesive material with safety pin, pass around to front and tie opposite ends securely over lower pelvis, using as retractor.

In order to get the confidence of the patient that there will be little or no pain, it is well to use a non-vacuum electrode in the rectum for five minutes. This application will also have an analgesic effect. Where parts are very sensitive or where a prostatitis is present, use a soothing application prior to treatment.

When possible, follow this with vibration, using the Pennington Cone, for the purpose of thoroughly dilating the sphincter muscle.

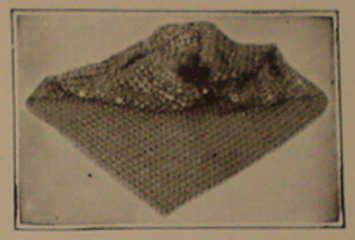
Use any good local anesthetic, and clamp down the hemorrhoids you wish to coagulate. Do not attack too many at one time. If an entire circle of tumors are present, work on only half—the patient will have no fear of the second operation, but will return readily to have the balance taken care of.

The indifferent electrode should consist of a piece of mesh 12 inches square. Cover thoroughly with warm soap lather and place under the patient, against the bare skin.

New Fischer Diathermy Accessories

Flexible Mesh Diathermy Electrodes

The most flexible *all-metal* electrode ever designed.



A Mesh Electrode



Section of Electrode showing exact size of links

Fits any part of the body like a glove, regardless of shape or contour.

May be employed in connection with Diathermy, Electro-coagulation, D'Arsonval Auto-condensation, Sinusoidal, Galvanism or any electrical modality where perfect contact on the skin is necessary.

Composed of a series of flat links of German silver, they are flexible, practically indestructible, easily sterilized, and forming an almost continual flat surface to be applied to the skin.

Endorsed by the best known physiotherapists everywhere.

Available in several widths and any desired lengths.



Application Mesh Electrode

Especially valuable for use on the knee, elbow, wrist, hand, spine, over the shoulder; in fact wherever it is difficult to make *perfect* contact with any other means.

This mesh material makes excellent cuffs for use on the limbs. Employ warm soap lather as a medium between the mesh and the epidermis, and hold the cuffs in place with elastic bandage.

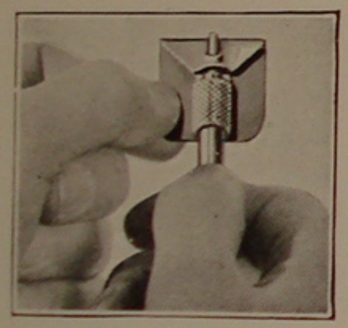
When treating a patient with a so-called "hollow spine" place a pillow on your table, lay the mesh on top, and be assured of *good* contact on every square inch of surface.

Once tried, always used. There are none better!

Cat. No. 844— 6 inches wide—code SAFROL....per lin. inch...$0.30
Cat. No. 870— 8 inches wide—code SAGGER...per lin. inch... .40
Cat. No. 871—10 inches wide—code SAGUMS...per lin. inch... .50
Cat. No. 872—12 inches wide—code SAILER....per lin. inch... .60
Cat. No. 873—15 inches wide—code SAKIEH....per lin. inch... .75

Will be cut to any lengths, on order.

FISHER DIATHERMY ELECTRODE CONNECTOR



Catalog No. 851

A simple device to fit the No. 1330 Diathermy Cord tip. Made of spring brass, nickel-plated.

The contact surface is flat, with small sharp protuberances to prevent slipping from the electrode. Designed for use with the Mesh Electrodes and Elastic Bandage.

Cat. No. 851—Flat Connector—code MESCON—each....$0.30

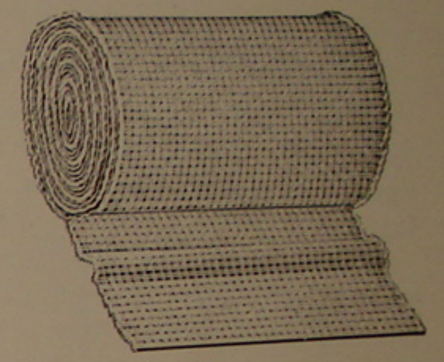
THE FAHNSTOCK CLIP

A spring clip which is quite satisfactory for use in connection with Mesh or Block Tin Electrodes, which will hold equally well with any size cord tip or wire.

Cat. No. 852—Spring Clip—code FACONN—each $0.15

ELASTIC BANDAGE

Many methods have been advanced for holding Diathermy Electrodes in place, especially on the limbs, but nothing excels Elastic Bandage for the purpose. The Mesh material, or block tin, may be bound securely in place in a moment's time, and the electrodes thus bound will remain in position as long as desired.



Catalog No. 854

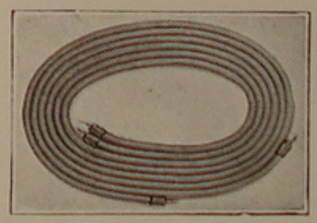
Employing Elastic Bandage is the only known method of binding Diathermy Electrodes to the limbs, which will permit the patient to move if necessary for the sake of comfort, without the electrodes shifting.

These Bandages may be washed, and always kept sanitary.

Cat. No. 854—3 inch width—code ELBAND—yard.....$0.35

NEW FISCHER DIATHERMY CORDS

Diathermy Cords are constantly getting wet, and when covered with a mercerized or silk webbing they are usually stained and discolored after but a few days' use.



Catalog No. 1330

Here are our much improved Diathermy Cords, covered only with pure gum rubber. They are very flexible, easily kept as clean as when new, and constructed to last indefinitely.

Cat. No. 1330—code NEGRO—6 foot pair.....$2.50

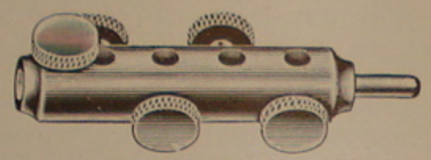
BIFURCATED DIATHERMY CORDS

Made up in the same style and of same material as our No. 1330 Cords, but with a 4-foot single length branching into two cords, each 2 feet long.

Cat. No. 1332—code SALIFY—each.....$2.00

FISCHER MULTIPLE CORD CONNECTOR

Often three or even four cord connections are desirable from one terminal and the ordinary Bifurcated Cord has not sufficient capacity or usefulness.



Catalog No. 865

Here is what we have to offer to fill that void. The small end tip is fastened into the proper binding post on your machine, and you may carry as many cords from it as desired.

Cat. No. 865—Multiple Connector—code SABLE.....$0.65

SAND BAGS

Just a few words on the subject of Sandbags. After the Diathermy Electrode is placed on your patient, as for example on the chest when about to administer a treatment for Pneumonia, the very best way to keep it there is with a properly designed Sandbag.

Not the heavy, bulky, thick variety, that will slide off at the first move of the patient, but one carefully designed for the purpose. Take a strip of heavy cloth or light canvas about 10 inches wide by 20 inches long, and fold it over lengthwise to form a bag 20 inches by 5 inches. Sew cross seams 5 inches from each end to form two pockets each 5 inches square. These pockets, only, are to be filled with sand, leaving the long 10-inch center strip flat.

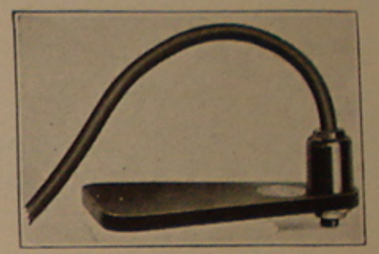
When this bag is placed over your patient, the flat part only bears on the electrode; the weights hang down at the sides. Try it.

The Fischer Electro-Coagulation Foot Switch

As illustrated, this Foot Switch lays close on the floor. A touch of the toe makes and breaks the contact.

Sufficient insulation has been used to make it shock proof. It is light in weight, easily moved about, yet keeps an upright position on the floor.

The foot-plate is of heavy sheet fibre. The cable is very flexible, and covered with pure gum rubber; it may be washed and kept as new always. Cable terminals will be furnished to fit any style apparatus.



Catalog No. 1205

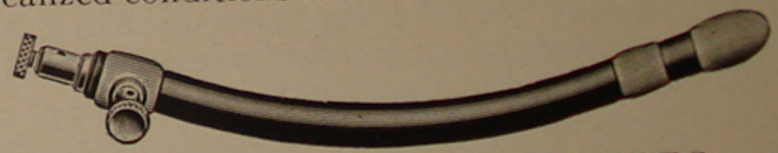
Catalog No. 1205—Fischer Electro-coagulation Foot Switch, with 8-foot cable, code THALES.....$12.00

Catalog No. 1206—Extra rubber covered cable, code TIBERI, foot. .10

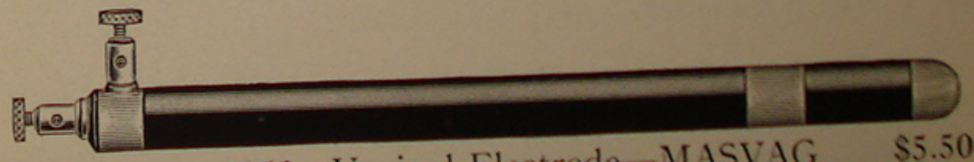
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New Two Pole Morse Electrodes

Suggested by Dr. Frederick H. Morse, of Boston, for treating localized conditions in the rectum and vagina.



Catalog No. 1852—Rectal Electrode—MASREC.....$5.50



Catalog No. 1853—Vaginal Electrode—MASVAG $5.50

Helpful Suggestions

J. G. Putnam, M. D., of Everett, Wash., writes us a lot of pleasant information, among which we find:

It is often necessary to use talcum powder on patients to facilitate treatments with glass electrodes. The electrodes become rather foul, usually, and I have found that the easiest way to clean them is a bit of scouring with Old Dutch Cleanser and warm water. The dirt just fades away.

□ □ □

My "service man" told me to put a bit of mineral oil in the leyden jars on top of the salt water. It prevents creeping and evaporation of the solution and does not impair the efficiency of the jar.

□ □ □

If the oil seeps from the transformer box by way of the terminals, loosen the screw plug to allow an expansion and contraction of the oil and air within the tank.

□ □ □

Dr. Greenaugh, of the Collis P. Huntington Hospital staff, stated recently: "The 'cure' of cancer by radium or the X-ray should not be over-emphasized. Radium alone, or X-ray, or Surgery—none has been an effective weapon against the disease. The best results are obtained from a proper combination of these methods in accordance with the nature and development of the growth."

□ □ □

If you are not a Fischer Booster you are not acquainted with the service we render. May we explain?

□ □ □

Remember it is always the busiest man who gets more business.

Epithelioma of Lower Lip

R. E. HOLMES, M. D., Windsor, Ont.

Male, age 56 years, had "this sore" on lip for 7 months. Had 12 X-ray treatments from the Doctor in the town where he lived, but the "ulceration" kept on spreading. When patient presented himself, three-fourths of the lower lip was involved and down to the level of the gums at one point.

Under local anesthetic (1% novocain) we electro-coagulated the entire field, using Fischer's "FO" Machine, 300 Milliamperes, with pointed electrode. This patient has not had any pain, nor any odor from his lip since we operated on his cancer. Now, six weeks later, it is all healed over with healthy mucous membrane except at the deepest erosion which exposed the full length of his teeth, but at present time has filled in to about half way up his teeth.

We would advise general anesthesia, as the electro-coagulation is very painful when one is operating close to the roots of teeth.

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The Question

One of our readers asks:

"Can fulguration be used instead of the usual 'saw and scissors' to rid the nose of hypertrophied turbinates? If so, what is the technic?"

Answer, from Dr. T. Howard Plank:

"Coagulation can be used instead of saw and scissors for nasal hypertrophies. Use about 300 to 500 milliamperes through a non-conducting speculum, rubber preferred. Time sufficient to thoroughly destroy mucous membrane and the portion of the bone which is desired to destroy.

"The soft tissues slough out in about two days, dead bone can be removed in about a month or six weeks.

"The indifferent pole can be placed any place on the body. If the area is small and the patient controllable, local anesthetic is sufficient, otherwise hyocine morphine anesthesia."

The Question Box

First permit us to repeat—we are striving in each issue of "Fischer's Magazine" to provide a "missing link" between your electrical equipment and your patients in the way of original articles, carefully selected reprints and readers' comments.



Every unit in the entire Fischer Company organization is constantly on the alert for methods of producing better apparatus, with an eye to efficiency; to improve means of application; to create a better understanding among operators, generally, regarding not only the various electrical modalities but their methods of production, as well. Opinions are so diverse that we feel everything possible should be done to clear the atmosphere.

Charles A. Palmer, M. D., of Red Bank, N. J., asks a few pertinent questions, adding, "I will be pleased to see both sides discussed in your wonderful little Magazine." He heads his letter: "Heat and Heat Only?"

"I can hardly see an article any more on Diathermy where the writer does not insert 'Heat and Heat Only.' Now I wish to be convinced that that is so.

"If it is so, what causes the heat? You say 'oscillation'—'tissue resistance.' Very well, isn't that something to count on besides heat? You say Diathermy reduces hypertension and stimulates the general circulation; also the lymphatic circulation and stimulates the blood in several respects; causes elimination and reconstruction (metabolism), etc., etc. My, what a lot Diathermy will do when we read about it! But is it 'Heat and Heat Only?'

"Now these are only a few things that Diathermy is supposed to do, and if Diathermy is so effective, where do any of the other electrical modalities deserve more credit? Do they leave a deposit of electricity that Diathermy does not?

"When we apply the Sinusoidal current to each end of a particular muscle, and get contraction, do we get contraction only? Or when we use it to relieve pain do we get the 'dope' effect only?

"I suppose when we apply the constant (Galvanic) current we get reduction of inflammation *only*, followed by the consequential results.

"I have also seen in print from (supposed) good authority that Auto-condensation and Diathermy are one and the same thing. Who believes that? Define the difference, please. Oh, well, along about 1930 these subjects will be brought up again and then several will pop up and say 'Why, I announced that way back in 1923'."

Editor's Note: Undoubtedly these same questions run through the minds of a great many of our readers, and each has formulated a reply to suit his or her own opinion. We, also, have answers for these questions—but how would *you* answer them? Just send your response to The Editor, who will keep a careful record and publish the various viewpoints in our August or September numbers.

□ □ □

The congestive stage of pneumonia is amenable to diathermy. The passive hyperemia is displaced by active hyperemia and the formation of inflammatory exudates prevented; the disease is promptly robbed of its succeeding stages, the patient recovers, leaving the attending physician very doubtful of his diagnosis.

Actinic Therapy in Rickets and Malnutrition

NEWELL JONES, M. D.

It is stated in this paper that 65 per cent of the children under eighteen months of age who live in the middle western part of this country have rickets in some degree or other, and that this condition is found much more frequently among children of the well-to-do than among the poor.

Dr. Jones believes with Bifield and Dean that early rickets predisposes to later chronic upper respiratory infections. Rickets produces deformities which prevent sinus drainage, produces a hyperemia of the mucous membrane throughout the whole gastro-intestinal tract, and results in a general muscular relaxation. All these conditions make the child much more susceptible to colds.

Hess of New York who uses direct sunlight in the treatment of rickets has secured most happy results. Pure codliver oil and the actinic ray will accomplish the same results. Direct sunshine must be from outdoor exposure and the whole body must receive a good coat of tan from the treatment to be of any effect, therefore this is an unfeasible method in any but a warm climate as the sunshine must be unfiltered by glass.

In his treatments Dr. Jones uses the air cooled lamp. Exposure at first is from one-half to three-quarters of a minute at a distance of from 20 to 24 inches, the child lying prone and the treatment being given both front and back. To avoid frightening the child it is taken into the treatment room but not given any treatment the first time, so that it may grow accustomed to its surroundings there.

Two treatments per week are given at first and the number is gradually increased until one is given every day. Distances must not be less than 10 to 18 inches. Some children can be worked up to a three and one-half minute exposure; one must be guided in this by the reaction. The whole body must be stripped, the eyes are protected by goggles or a bandage. The fair-skinned child as a rule can stand only about fifty per cent of what a dark-skinned child can receive.

In two or three weeks results will begin to show in better appetite, better functioning of the gastro-intestinal tract and a cessation of the sweating which is so characteristic in these cases. Later on the teeth will begin to hurry along, but bow legs, the doctor remarks, are not made over in a day. The hemoglobin percentage and the red blood cell count are greatly increased by the treatment.

Every case of rickets in a child, under eighteen months of age, treated by Dr. Jones has improved if given a fair trial. Two very extreme cases are reported as cured. After eighteen months of age treatment will accomplish nothing except to build up the general nutrition of the body.

From a paper read at Omaha, December, 1922

□ □ □

We are very often called on to recommend books on the subject of Physiotherapy, generally, and offer the following:

On Diathermy—	
Sampson's "Physiotherapy Technique"	$6.50
Cumberbatch's "Diathermy"	6.00
Saberton's "Diathermy"	2.25
Grover's "High Frequency Practice"	4.00
On Wave Currents—Morse's "Wave Therapeutics"	2.50
On High Frequency—Grover's "High Frequency Practice"	4.00
On Constant Currents—	
Sampson's "Physiotherapy Technique"	6.50
Grover's "Electro-therapy"	4.00
Morse's "Wave Therapeutics"	2.50

All of these books are carried in stock, and delivery made on receipt of orders.

□ □ □

Diathermy isn't theory—it is practical fact.

□ □ □

We suspect that many of the folks who have the reputation of being hard-boiled eggs got that way from being in hot water most of the time.

A PAGE OF FUN



Preparedness

Bang! went the rifles at the maneuvers. "OO-o!" screamed the pretty girl—a nice, decorous surprised little scream as she stepped backward into the arms of a young man.

"Oh!" she said blushing. "I was frightened by the rifles. I beg your pardon."

"Not at all," said the young man, "let's go over and watch the artillery."

□ □ □

Fact, Not Fancy.

"If you please, ma'am," said the servant from Finland, "the cat's had chickens."

"Nonsense, Gertrude!" returned the mistress of the house. "You mean kittens. Cats don't have chickens."

"Was them chickens or kittens that master brought home last night?"

"Chickens, of course."

"Well, ma'am, that's what the cat has had."—Youth's Companion.

□ □ □

Extravagant

Small Boy: "Take me to the movies muvver."

Mother: "Now then, haven't yer just had a haircut? Yer always craving after amusement."

□ □ □

P. D. Q.

"The average woman has a vocabulary of only eight hundred words." It is a small stock, but think of the turnover.—Oakland Tribune.

Another Ford Story

Two gentlemen were uncertainly flivvering their way home from a party.

"Bill," said Henry, "I wancha to be very careful. Firs' thing y' know you'll have us in a ditch."

"Me?" said Bill in astonishment, "why, I thought you was drivin'."

□ □ □

Ouch!

Cholly: "You know, last year the doctor told me if I didn't stop smoking I'd be feeble-minded."

Grace: "Why didn't you stop?"—Cougar's Paw.

□ □ □

Diplomacy

She: "John, do you prefer blondes or brunettes?"

He: "Yes, dear!"

□ □ □

Motorist—"Madam, I am sorry that I killed your dog. May I replace him?"

Spinster: "This is so sudden!"

A THOUGHT TO BE WORTH WHILE MUST COMPLETE ITSELF IN ACTION.

FISCHER'S MAGAZINE

Fischer
CHICAGO, ILL.

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347

AUGUST, 1923

Every Life is a Strife—With Temptation or With Conscience.

Most of us Want to be Right, but few of us like to be Put Right.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. I AUGUST, 1923 No. 11

Physiotherapy

The word physiotherapy is one of those high sounding forms of speech that cause the average person, professional or lay, to conjure up some mysterious medical means known only to the initiated. As a matter of fact we all use physiotherapy to a greater or lesser (usually lesser) extent. In putting a patient to bed we employ physical means of therapy of the greatest importance, for we change the mechanics of the circulation. In applying a surgical dressing we use physical treatment.

External applications of heat have long been employed in the form of hot water bags or poultices of various kinds. In this connection it is interesting and significant that the heat of the living body was formerly believed to be of an entirely different nature from that which emanated from any non-living source. A puppy dog was considered a more effective therapeutic agent than a hot water bag, and the heat from a young human body was sometimes prescribed for the treatment of the elderly invalid.

Massage and both passive and active motions have been used more or less from time immemorial, as has also hydrotherapy. The morning cold plunge, which has been recommended for every ailment to which flesh is heir, is but a simple form of physiotherapy. Electricity, in some form or other, has had its vogue, as have sunlight and colored lights. There have been elaborations in the applications of posture, movements, rubbing, heat, baths, electricity, and light, but

after all there is little that is new, and because they do not savor so much of the occult as does chemiotherapy, if we may use the term for drug treatment, they have been neglected sadly by the profession, which has preferred to wield the prescription pen or the carving knife, to the neglect of means which are less mysterious and spectacular. As a consequence, practitioners with neither knowledge nor skill have been reaping a harvest by the hit or miss application of physical means. As we have said in these pages before, it is high time the profession was awakening to the importance of such therapy.

We have heard much more of physiotherapy since the war, in connection with injuries, and, indeed, its importation in this connection was one of the good things which we gained from the war. For a quarter of a century these means had been highly developed in Europe on account of the monetary importance of returning an injured workman to his job at the earliest possible date. The shortening of convalescence reduced the workman's compensation accordingly. When the war came the same machinery was ready prepared for application for the speedy return of the wounded man to his place in the ranks. There was nothing new about it except to American eyes. Since the war one hospital in this country, which deals to a large extent with the wounded from the ranks of labor and which has established an elaborate physiotherapy department, finds that, in its fracture cases, the saving in time of recovery, compared with their records under the older methods, is from ten to thirty per cent., according to the nature of the injury, while the recovery is, also, more complete.

But physical means are as useful in medical cases as in surgical, and even where they accomplish little directly, from a physical point of view, the very fact that *something is being done for the patient* produces an effect mindwards which reacts for speedy improvement or cure.

—From an Editorial in the New York Medical Journal, July 1923

Diathermy in the Treatment of Diseases of the Bladder in the Female.

Iwan v. Büben (*Zentralblatt für Gynäkologie*, July 15, 1922) asserts that diathermy is a valuable adjunct in therapy, owing to the promotion of the healing power associated with the increased temperature and resulting hyperemia and the other physiological powers, especially in regard to its powers of relieving pain in the painful cystitides and in tenesmus. Diathermy is produced by means of an electric current of high tension and rapid alternation, which produces heat in the deeper tissues. The amount of heat developed depends upon the intensity of the current, the resistance of the perfused tissues, and the size and form of the electrodes. A large and a small electrode are used, the current being made to pass from the larger electrode to the smaller one, so that most of the current and heat are developed at the latter. If the electrode is too small, a coagulation of the tissues results with the use of strong currents; this is called a cold cautery and is used with good results for the extirpation of bladder tumors, chiefly papillomata.

The author treated with diathermy fifty cases, chiefly of cystitis, with incontinence and painful urination. The treatment may be extravesical or intravesical. The extravesical treatment is given with olive electrodes (with a thermometer embodied in the instrument) applied intravaginally; the external electrode, consisting of a lead plate as large as the palm of the hand, is applied over the bladder at the symphysis. The results with this form of treatment are not as good as those obtained with the intravesical form. For this form of application, the author devised an irrigating electrode, through which the bladder is first filled with one hundred to three hundred c. c. of physiological saline solution and the electric current is then applied in the same manner as in the extravesical treatment. This treatment is given three times weekly for ten to twenty minutes, with a current of 0.5 to 1.0 ampere. Marked improvement in the symptoms is noticed after ten treatments. The best results are obtained in the cases of painful urination and in enuresis nocturna.

—New York Medical Journal, July, 1923

Tonsillectomy

Electro-Coagulation and Desiccation

By A. M. MacWhinnie, M. D., Seattle, Wash.



Theories regarding the function of the faucial tonsils are many and varied and so far but one is accepted clinically. There is no dissension, clinically, from the belief that the tonsils furnish a secretion for the lubrication of the pharynx and act as a support to hold out the pillars in their advanced position in the pharynx. The ablation of the tonsil and its capsule obliterates this function completely or partially and the arch atrophies, as well as the palatoglossus and palatopharyngeus muscles.

There is a widening of the faucial space and at the same time a loss of action of the soft palate, tongue and larynx. It is only on account of these functions being compensated by other tissues that the voice retains some of its quality. Even so, the throat tires more quickly than under normal conditions, and dryness is frequently complained of.* * *

In revieiwing the literature, one is impressed with the various opinions of the different men as to what is an infected tonsil. One can only conclude that no precise and definite standards have been accepted.

* * * The treatment of tonsillitis seems today to be based upon infection. * * * There are no definite criteria for what constitutes the cardinal symptoms for finally determining the necessity for removing the tonsils; each individual physician uses his own udgment. * * *

When we have definitely established that the tonsils are the seat of infection, there is but one course to pursue—treatment of the blood chemistry and a complete eradication of the tonsils by some method that will leave the throat with as great or greater functioning power than existed previous to the operative procedure. The consensus of opinion is that

the operative procedure of choice is one in which the tonsillar capsule, so called, shall be left intact and thereby retain as near as possible the complete functioning power of the palatoglossal and palatopharyngeal muscles. Following the sharp cutting operations, we have all been chagrined to see the various deformities amounting almost to distortion, rapid tiring of the voice following speaking, as well as of the individual physically, so that many speakers, who previously had been able to speak for an hour at a time, found themselves completely prostrated after fifteen minutes' speaking.

Kenyon asserts that ninety-five per cent. of the patients who have been operated upon by the cutting method show a deformity of some kind. This must strike one as very strange, for of all operators upon the tonsils in this country surely more than five per cent. are first-class. Many of us have dissected out most beautifully the tonsil and its complete capsule, with apparently no injury to the palatoglossus and palatopharyngeus muscles or the superior constrictor, congratulating ourselves on the beautiful result, and then, at the end of say three months, are chagrined to see the fossa fill up level with the pillars, retarding their action. In the cases where this does not take place, a gradual thinning out, an atrophy of the palatoglossus and palatopharyngeus muscles takes place with loss of functioning power in the voice from lack of capsule support.

* * * In operative procedures upon the tonsil, one must never lose sight of the accidents which may occur. The anomaly of the arteries in elderly patients; the possibility of hemorrhage in proportion to the clotting time of the blood and blood pressure; pulmonary abscess; anterior dislocation of the atlas; pain in the tonsil region, neck, and larynx, said by Justus Matthews to be due to the larger branches of the glossopharyngeal nerve being injured.

What shall be the operation of choice? One in which the loss of blood and shock is reduced to a minimum and in which the patient will be better off physically and the voice equal to or better than before the operation. No cutting operation

that removes the entire capsule can give as good a result as one in which there is a complete removal of all the tonsillar tissue leaving the capsule intact.

* * * With the intimacy that exists between the capsule and the superior constrictor muscle, and the dangers that attend cutting operations, a procedure that will eliminate all tonsillar tissue and leave the capsule intact to act as a supporting membrane to the superior constrictor, glossopharyngeal and palatopharyngeal muscles is the ideal method for eradication, with the highest possible physiologically functionating throat. Makuen states that he believes leaving the capsule intact is perfect surgery. No cutting operation that involves the removal of this capsule can insure the operator, as well as the patient, that he will have a throat which will function physiologically.

In removing the tonsils we find that there is pus formation in or around the tonsils, with the result that a certain amount of absorption of pus into the system takes place, evident for a week or ten days, and sometimes longer. Any procedure that will eliminate this, it seems to me, is ideally perfect.

We must never forget that we are operating up into the cervital region, and it has happened that serious infection has resulted from opening this area. In reading over operative procedures, we find numerous instances where most operators make an anterior and posterior incision, cutting through into the intrapharyngeal aponeurosis, thus taking away one of the supports of the anterior and posterior pillars.

It may seem presumptuous on my part to offer a new method for tonsil eradication, leaving the capsule intact, when there have been so many tonsil operations recommended, but only after six years use is it offered.

With electro-desiccation or thermo-coagulation all the difficulties enumerated can be avoided. One must remember that the equipment should not consist of a box such as sold by some manufacturers. One must have a machine of ample power with a milliampere meter so that the current can be measured accurately. Experience, alone, will give one the desired information as to the length of time the current should be applied and the number of milliamperes required for a thorough eradication of all tonsillar tissue. The variation in the amperage is from 100 to 1,000 milliamperes, depending on the consistency of the tonsillar tissue and its depth. Roughly speaking, 800 milliamperes suffice with the active electrode well inserted in the tonsil and the indirect electrode on any other part of the body * * * with the coagulation method the tonsillar tissue disappears in about ten to fourteen days following the application * * *. It can be stated that this method is absolutely painless.

—Extracted, New York Medical Journal, June, 1923

□ □ □

Effect of Radiation with Mercury Vapor Quartz Lamp

From the experiments reported by Hume it is apparent that irradiation with the mercury vapor quartz lamp can prolong normal growth on a diet almost free, or free, from vitamin A. Whereas without irradiation growth ceased to be normal after from seven to ten days, with irradiation it continued to be normal for from thirty-five to fifty days. Symptoms of vitamin A deficiency then began to appear, and symptoms of xerophthalmia set in earlier than in control animals. Attempts to revive growth and to cure xerophthalmia by irradiation of animals which had long (over ninety days) been on a deficient diet failed completely; the animals seemed, if possible, to go to pieces more rapidly. Irradiation of rats which had been for shorter periods (from seventeen and thirty-five days) on a vitamin A deficient diet produced a growth response which appeared to be inversely proportional, in its duration and extent, to the length of the previous period of deficient diet. The general conclusion drawn is, that there is an interaction between vitamin A and light for the growth of rats, but that the action of the light is not to produce a photosynthesis of the vitamin.

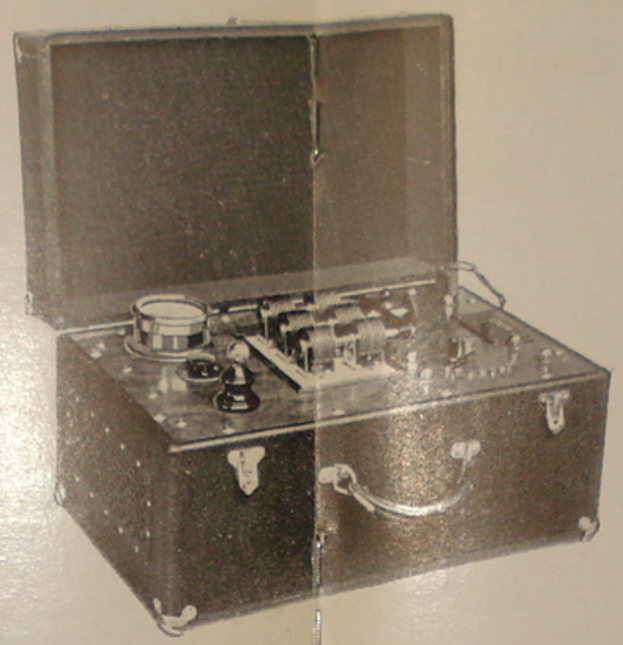


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Advertisement

Treatment by Diathermy

W. J. TURRELL

The first effect of diathermy is an increase in the temperature of the part treated; the later effects are relaxation of the tissues and dilation of the blood vessels with a consequent increase in the blood supply to the part treated. The therapeutic effects of diathermy are therefore explained by the lowering of the blood pressure, the relaxation of spasm with the relief of pain, and the improved nutrition of parts whose blood supply has been deficient.

It is in the relief of spasm and pressure, and therefore of pain, that diathermy finds one of its important indications in clinical practice. Neuritis, deep-seated pain such as that associated with dysmenorrhoea, the spasm of a ureter excited by the passage of a calculus, the hypertonicity of the lumbar muscles in lumbago, or of the neck muscles in torticollis, the muscular rigidity of local tetanus, the pain of a recently sprained ankle, are usually markedly relieved and often cured by this treatment. Atrophic conditions improve very much because of the nutritional effects of the increased blood supply.

In surgical diathermy the heat is concentrated on one spot, while in the medical applications it is distributed over a large area. Surgical diathermy differs from the destruction of tissue by heated irons or the Paquelin cautery in that, when properly applied, it effects destruction by heat coagulation rather than by charring or incineration.

Intravesical growths, haemorrhoids, benign or malignant superficial growths, lupus, moles, enlarged tonsils, naevi, etc., are suitable for this treatment. Diathermy is also a delicate and efficient method for depilation.

From Brit. M. Jour.

□ □ □

X-ray keratoses are best treated by desiccation; X-ray ulceration by actinic rays. Diathermy materially assists in either case.

Blood Pressure Briefs

By Burton Baker Grover, M. D.

Hyperpiesia is a more common cause of retinitis than chronic nephritis. Treatment: Autocondensation for hyperpiesia and kidney diathermy for nephritis.

□ □ □

Heart force does not per se produce hypertension but the conditions prevailing in the blood vessels, chiefly in the arterioles and capillaries. Loss of elasticity calls for increased heart force to overcome the resistance.

□ □ □

Normal blood pressure is more or less maintained by the capillary network which acts as a suction pump. This function is easily disturbed by nervous excitement, worries, etc.

□ □ □

Systolic pressure may be as low as 90 during sleep and high as 180 during hard work. An occasional high reading does not constitute hypertension.

□ □ □

There are more diseased hearts in the normal blood pressures than in the low pressures.

□ □ □

Causative factors in HYPOTENSION, in order of frequency are: diseases of the digestive system, diseases of the vascular system, infections, psychoneuroses.

□ □ □

Ill-advised exercises "to keep fit" are frequent causes of hypertension and later on heart failure.

□ □ □

Use Diathermy next time.

□ □ □

Ask any doctor who uses Diathermy.

□ □ □

Diathermy isn't theory—it is practical fact.

Diathermy in the Treatment of Hypertension

By William Martin, M. D., Atlantic City, N. J.
Late President Amer. Electrother. Assoc.



The subject of hypertension is too large to enter into a discussion of it in more than a very condensed way in a paper short as this must necessarily be, therefore, it is the purpose to simply take up one phase of it, the hepatic engorgement, which is practically always present in all cases of high blood pressure.

We who are constantly treating these cardiovascular renal conditions in which hypertension plays an important part, realize the constancy of the hepatic turgescence and the general circulatory stasis of the various organs. That the liver contains normally one quarter of the body's blood, predisposes it to this stasis and it is the chief organ to so suffer. When we consider the important function of taking care of toxins, we can see how important it is that this function be kept up to the highest point of efficiency in order that the health of the body be maintained. With a circulatory stasis present to any extent, it can be readily seen how this function will be modified or entirely put out of commission.

We constantly see people who state that they are subject to "bilious attacks." These will in time naturally show a hypertension as the result of an over engorged liver, which is "laying down on its job," simply because the toxins cannot be eliminated, and the kidneys and other channels become overworked in the effort to do more than their duty.

It is important, therefore, in all cases of hypertension to examine carefully for an engorged liver, and even though it may not be markedly enlarged, treatment toward enhancing its functions should not be neglected. All cases of hypertension should receive some treatment of this organ, else the

work is not done. Whether this be by diathermy or the static wave, sinusoidal or other, matters little, so long as the result is secured. In the writer's opinion, diathermy should be used no matter whether one of the other two modalities is or is not used, but of course the use of the latter should be a matter of judgment. By this is meant, in cases of very marked hypertension, the diathermy is of importance, while the static or sinusoidal will be too stimulating during the period of the pressure height. Subsequent to a reduction to the point of safety, one or the other should be used in addition to the diathermy, as the result will be more quickly accomplished. In the writer's judgment, the static wave current is then the current of choice.

In order to be effective, diathermy must be given in sufficient dosage and for long enough periods to make a marked impression upon the circulation of the organ. This will mean large electrodes with current strength to meet the proper surface measurement, and for at least a half hour or longer, and treatments given daily at least for a time, when they can be given on alternate days.

In using diathermy, it is not to be understood that this displaces auto-condensation, for it does not. The latter is equally important and the two work together beautifully, and all cases should have this double team work for best results. With this goes all the care usually necessary along lines of diet and other attention, and of course this is understood.

While this short paper cannot do other than touch the high spots, the writer feels its real purpose is to press upon the minds of the readers the necessity of clearing up all hepatic stasis in all cases of hypertension, as this is perhaps the keynote of success in these usually intractable cases.

Maryland & Pacific Aves.

□ □ □

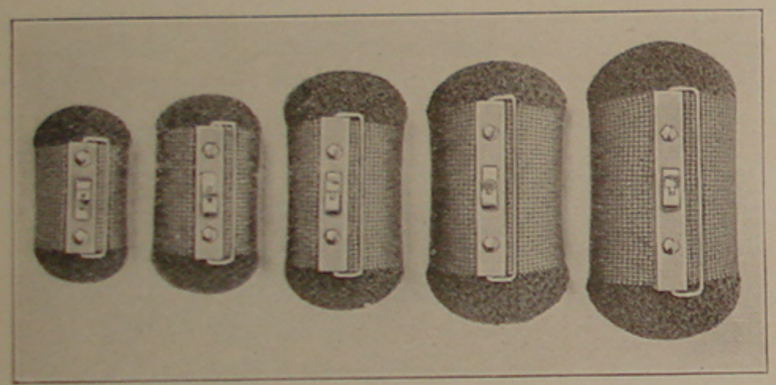
We suspect that many of the folks who have the reputation of being hard-boiled eggs got that way from being in hot water most of the time.

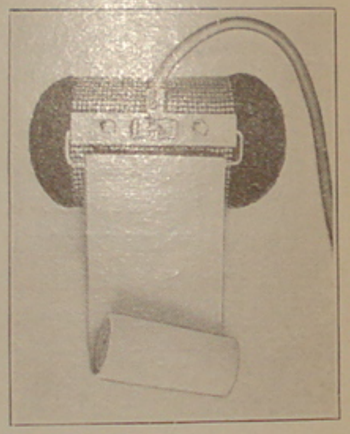
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The Sponge Rubber padding may be washed and always kept clean. It is very soft, and conforms well to any uneven surface. The elastic bandage is entirely removable. Stocked in five sizes:

	Code	Price
Cat. No. 890—Sponge Mesh Electrode—2½"x3"	NEKTON	$2.00
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For employing the "Cuff Method" of applying diathermy to the limbs and joints, every physician should have at least one pair of Mesh Electrode Cuffs. These are strips of German Silver Mesh, 3 inches wide and from 12 to 24 inches long, with an arrangement fastened to one end for holding the elastic bandage. Very convenient and handy, and once used will be found indispensable.

	Code	Price
Cat. No. 900—Mesh Cuff and Clamp—3x12"	NEPHEW	$2.55
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Reserve the dates—October 15th to 19th

An important announcement, of vital interest to Physicians everywhere, will appear in the September issue of this Magazine.

Red Letter These Dates, and watch for particulars!

IN PREPARATION

Diathermy and its Application to Pneumonia

By HARRY EATON STEWART, M. D.

Attending Specialist in Physiotherapy, U. S. Marine Hospitals, N. Y.
Consultant in Physiotherapy, U. S. V. B. Hospital, New Haven, Conn.
Director, New Haven School of Physiotherapy
Formerly Assistant Director, Section of Physiotherapy, Office of the Surgeon General, U. S. Army, and Supervisor of Physiotherapy, Bureau of U. S. Public Health Service, Washington.
Author "Physical Reconstruction and Orthopedics."

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A PAGE OF FUN



A party of holiday-makers were paying their first visit to New York, and for one of their number the endless row of buckets in a dredger at the docks seemed to possess a singular fascination.

While the others went off to enjoy themselves Archie would not budge an inch, but kept his eye firmly fixed on the dredger. Some hours later his friends found him still at the same spot.

"Archie," said one of them, "if you stay there much longer you'll miss the train."

"I don't care," was the reply, "I've counted 8,990 and I mean to see the last of those buckets if I stay here all night."

□ □ □

Experienced

"You must have been walking carelessly," said the lady whose car had run down a man. "I'm very careful. I've been driving seven years."

"Lady, that's nothing, I've been walking for fifty-four years."—Erie Dispatch.

□ □ □

As Good as Gold

"He says that he hasn't paid out a cent for repairs on his car in the two years that he has had it."

"Gee! I wish I had a credit like that."

□ □ □

The Very Idea!

Teacher—"This time we are going to have a little talk on wading birds. Of these the familiar stork is one—what are you laughing at, Elsie?"

Little Elsie—"Oh, but teacher—the idea of there being any storks!"

He Knew Her

Wifey: "On your way home, will you ask that girl at the store to—"

Hubby: "The one with the blue eyes, blonde hair and dimples?"

Wifey: "You needn't mind. I intended to go to town myself to-day."

□ □ □

Necessities Only

Winter Guest (in wilds of New Hampshire to keeper of country store) — "Have you any tooth brushes?"

Storekeeper—"No, we don't keep any of them summer novelties."

□ □ □

Sweet Memories

'Twas at a wedding yesternight,
A young man sat sedately,
I asked him if he'd kissed the bride,
He answered me, "Not lately."

We grow more gentle in our judgements as we grow better acquainted with ourselves.

The most severe critics of others are those who have not learned their own weaknesses.

FISCHER'S MAGAZINE

THIS BOOK

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SEPTEMBER, 1923

THE SUCCESS FAMILY

The Father is Work—
The Mother is Ambition—
The Sons are
Common Sense, Perseverance,
Honesty and Thoroughness—
The Daughters are
Character, Loyalty,
Sincerity and Cheerfulness—
The Baby is Opportunity.
Get acquainted with the "Old Man" and you will be able to get along with the rest of the family.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. I SEPTEMBER, 1923 No. 12

Anent Progress

It has been stated, and truly, that we must either advance or retreat—that we cannot remain stationary.

For many years it has been the avowed purpose of H. G. Fischer & Company to **advance** the science of Electro-physiotherapy among physicians, and the development has been very steady—both apparatus and applied technic keeping a fairly even pace.

However, in the mails every day recently have come requests for information regarding some good school or central point where practical, first-hand instruction may be obtained bearing on the latest in physiotherapeutic technic, and it does seem that present-day equipment is just a few steps ahead of the average operator.

It is for this reason that we, **who desire at all times to hold the lead in such matters,** wish to pass on the benefit of our vast experience coupled with the technic as applied by aggressive and progressive physicians in the Electro-physiotherapeutic field, and are offering this opportunity in broader sense than has ever before been attempted.

Read our initial announcement on pages 8 and 9 of this issue, and see our October number, as well as the Journal A. M. A. and other leading medical papers for complete program and further information.

Diathermy in Diseases of the Circulatory System

By Elnora Cuddeback Folkmar, M. D., Washington, D. C.

Diathermy has a profound effect on the circulation. General diathermy tends to reduce hypertension and to raise hypotension to normal tension. Local diathermy causes a local dilation of the blood vessels of the part treated. Blood from the surrounding healthy tissues rushes into the dilated vessels. This influx of healthy blood replaces the stagnant poisonous blood, and increases cell metabolism and germ resistance.

Diathermy in Hypertension

Before treating a case of high blood pressure with diathermy, one should ascertain the cause of the hypertension. If it is a compensatory phenomenon, no attempt should be made to reduce it. In this case treatment should be directed to the renal, hepatic, cardiac, pelvic or other diseases of which it is a compensation. The author has reduced many cases of hypertension—190 to 240 mmHg.—by first treating the constipation and mucous colitis which was the source of the toxaemia.

In these cases, after the bowel is cleared of debris and enterotoxins, diathermy may be employed—general diathermy by means of the condenser pad or chair, or better still local diathermy through the abdomen. In general diathermy use 400 to 800 milliamperes of current during a period of 15 to 25 minutes. In local diathermy use large electrodes and pass a slowly increasing current of 500 to 2,000 milliamperes during a period of 20 to 30 minutes.

The blood pressure will usually be found to be reduced after this treatment from 10 to 30 mmHg. The skin will be warm and often bathed in perspiration, and the body temperature as indicated by a thermometer in the mouth, will be increased from one-half to one and one-half degrees. What takes place during the treatment? The peripheral vessels are dilated by relaxation of muscular spasm. Relief of engorgement of internal organs is shown by profuse diaphoresis and diuresis with increase in the amount of solids in the urine. There is an increase in oxidation and elimination of toxic materials. The character of the pulse is changed. It is soft and more regular. Improved metabolism is soon shown by increase in physical and mental strength of the patient.

Dr. deKraft maintains that "moderate doses of high frequency current applied by the method of auto-conduction (general diathermy) will effect a reduction in blood pressure in all cases of simple hypertension."

This will be continued in our next issue under the heading "Diathermy in Hypotension."

□ □ □

Effect on Growth of Radiation with Mercury Vapor Quartz Lamp

It is shown by Goldblatt and Soames that young rats, if irradiated with the mercury vapor quartz lamp from the time they are put on a diet very deficient in fat soluble vitamin A grow more rapidly, reach a higher maximum weight, continue to grow for a longer period, and, finally, show a general condition better than that of control rats from the same litter receiving the same diet but no irradiation.

Similar differences between irradiated animals and controls were observed even in the case of a litter of rats brought up by a mother who was fed on the same deficient diet during the latter part of pregnancy and the entire period of lactation. It is apparent that irradiation with the mercury vapor quartz lamp cannot act as a substitute for the fat soluble growth promoting factor which is a necessary element of the diet.

Dr. T. Howard Plank, of Chicago, stated at Omaha recently —"Don't depend upon the Ultra-violet rays alone for every disease and case, because it will not 'cure' all your cases. I do not like that word 'cure.' If we arrest some of these things it is all that we can do. Many get well, and you may have a recurrence in six months or six years. Your patients get rid of their symptoms, their digestion is all right and they are happy.

Use everything else you know to be of any benefit to that particular type of case. There is no reason while using Ultra-violet rays to exclude any drugs you have ever used, because one does not interfere with the other."

He reports successful treatment of psoriasis, though every case will not yield to treatment. Abscess in osteomyelitis, mastoids refusing to heal after operation, erysipelas, old varicose ulcers, lupus and light tuberculous lesions are among the conditions and diseases that he has successfully treated with the ultra-violet rays. He also reports a case of stitch abscess following an appendectomy which was greatly helped by ultra-violet treatment.

He warns against using these rays upon boils until after drainage is established; after that they aid in the recovery. Pernicious anemia and hay fever while relieved to some extent, he does not regard as very amenable to ultra-violet treatment.

Drawing attention to the research work at Johns Hopkins which has proved that the ultra-violet rays are as efficacious in rickets as is codliver oil, Dr. Plank cites a case of anemia where the haemoglobin of 15% was brought up to 40% within thirty days, and the red cell count greatly increased, and he remarks that there is no doubt of the general systemic improvement under ultra-violet treatment.

—Abs. Jour. Radiology.

□ □ □

There is no doubt about the supremacy of Fischer apparatus.

Physiotherapy From a Surgeon's Standpoint

By F. J. Cotton, M. D., Boston, Mass.



The rise of physiotherapy into the position of a recognized and acclaimed specialty has been so phenomenally rapid that there has been time only to progress and expand in the way of practical utilization of this special therapeutic activity or group of activities.

Now perhaps the time has come for taking stock.

Many of those who believe most thoroughly in the possible development of the specialty have lately realized more and more certain dangerous tendencies.

To be brief: they are

(1) The tendency to overclaim.
(2) The tendency to routine.

Not many years ago the field, such as it was, was in the hands of a few workers—specialists as a rule in one or another somewhat narrow special field—enthusiasts (as it is only right for a specialist to be) over the possibilities of his special medium —whether that was electricity or hydrotherapy or Swedish or other exercises.

They were in unfortunate competition—the best of them with untrained men and with fakers and up to the time of the great war progress was uneven and not too rapid.

With the great needs of the war and especially with the unification into one major specialty of all physiotherapeutic procedures, swift advance was possible.

Today we have a specialty of treatment by physical means—not surgical—including electro-therapy, hydro-therapy, thermo-therapy, massage, mechano-therapy, general and special exercise, etc.

The field and the demand for service have broadened immeasurably.

Today everyone recognizes the need of aid from the physiotherapist in almost every field.

But one hears criticism and it comes particularly from what we may call the business side in relation to the care of injuries, only a part of our field, but no unimportant part.

Today all over the country the man or woman who gets hurt at work receives compensation, and in effect he usually gets it from an insurance company until he can work.

Therefore, the company is violently interested in the time of his return to work and in many places and instances willing to pay for treatment that will shorten his disability.

But it is in part a matter of business with them.

And while the war has taught them the importance of physiotherapeutic means to aid recovery—yet they have been "stung" a good deal by offers to cure incurable cases and by the piling up of charges for routine work not very productive. And they are growing a little skeptical in spots.

We can tell them that they had better have cases examined before treatment and that frequent reviews of cases under routine baking and massage is at least wise.

But, the trouble lies deeper. It is that the physiotherapist himself, doesn't know as he should what he can promise—even in this class of cases alone—is apt to hope for too much, and later is very apt to overestimate results.

Now this gets nowhere, for no result is any good to the insurance company that doesn't mean recovery and ability to work—and he knows what he gets.

Outside these insurance cases—for the moment—how definite an understanding can the average physiotherapist give me, ignorant of detail, of what I had better do, to whom I had better send a case of joint stiffness after luxation, of myositis ossificans, of delayed fracture union, of traumatic arthritis, of osteoarthritis, of neuritis, of keloid scar, of scar contraction, of local muscle atrophy, of obesity with high blood pressure, etc.?

Physiotherapy, without clear pathological conceptions and without clear vision as to how a given procedure will act on a given pathology, and with what chance of success, is headed for trouble.

Routine application according to symptoms will not do.

And what of cases, not a few, that are treated for months, sometimes years, to relieve joint stiffness due to bony thickening or to wood-hard cicatrices?

They constitute an indictment.

What is the remedy?

First, work closer with the clinicians—men who are not close specialists, but are trained to pathological diagnosis, to impartial judging of results and progress, even their own. Second, more important: find out where we stand.

Get together a "fact-finding" committee—they are fashionable just now—a committee of clinicians acting with the broadest physiotherapists—working in a big hospital, and have them go over the field, treat cases and check results. It would take not months, but several years, but if we could in the end give a definite view of what physiotherapy can offer in a wide group of diseases and injuries and what particular sub-department of the specialty—if we could know that in one case diathermy, in another baths, in another X-rays, in a fourth muscle-training has so much to offer—it would be worth it.

If you do this, *don't* get the *big* clinicians. Get good ones who still have some time—well-trained men just below the service heads in a big hospital, let's say, for this is a proposition to do work and work that I believe eminently worth while.

—From the Journal of the New England Association for Physical Therapeutics

Special Announcement

As a result of repeated requests, due directly to the difficulty experienced by physicians in obtaining practical information from reliable sources in the efficient application of Electro-therapeutic measures, there will be a series of lectures and clinics held in Chicago, on October 15th to 19th inclusive, at the Logan Square Masonic Auditorium.

The following Physicians will participate:

Gustav Kolischer, M. D., G. U. Surgeon at the Michael-Reese and Mount Sinai Hospitals, Chicago, Illinois.

R. W. Fouts, M. D., Roentgenologist, the Lord Lister Hospital, Omaha Nebraska.

T. Howard Plank, M. D., Physiotherapist, the American Hospital, Chicago, Illinois.

Frederick H. Morse, M. D., Boston, Massachusetts, Ex-President the American Electrotherapeutic Association.

Curran Pope, M. D., Louisville, Kentucky.

Emile Du Val, M. D., Chicago, Illinois.

Frank M. Barns, M. D., Albion, Nebraska.

Roswell T. Pettit, M. D., Physician-in-charge at the Illinois Valley Hospital, Ottawa, Illinois.

H. I. Smith, M. D., Chicago, Illinois.

Ward P. Burdick, M. D., President St. Anthony Hospital Staff, Rockford, Illinois.

A. L. Yocum, Jr., M. D., Chariton, Iowa.

A number of other physicians skilled in physiotherapy technique have tentatively promised to be present and to give one or more lectures.

These meetings will be open to all physicians of standing. There will be no admission charge, and no obligation imposed by attending. All practitioners are equally welcome regardless of the types of equipment they may be using.

The complete program, instructive and enjoyable, has been arranged with a view to promoting greater efficiecncy in this field. It will be strictly informal, allowing the greatest freedom for questions and answers.

The Dates—October 15th to 19th, Inclusive

The Place—The Logan Square Masonic Auditorium

at the terminus of the Logan Square Metropolitan Elevated Line

CHICAGO, ILLINOIS

It is earnestly requested that registration be made at once, as, although the Auditorium facilities are almost unlimited, certain preparations must depend upon the number in attendance.

To be held under the auspices of H. G. Fischer & Company

Treatment of Lupus by the Diathermy Condensor Spark.

A. E. Milner (*Lancet*, December, 23, 1922) is convinced that this form of treatment does not fail to cure lupus vulgaris simplex and as this is the first stage of the catarrhal form, the importance of treating these cases early is apparent. The ideal patch for treatment is the small one; more extensive patches can be cured, but the treatment is tedious. This treatment is superior to scraping owing to the fact that the diathermy spark actually destroys the tubercle bacillus, whereas curettage leaves behind many tubercle bacilli in the vicinity of the wound. The cases of lupus that persisted were those with tuberculous affection of the mucous membrane either of the nose, gums, or lacrymal apparatus. The latter parts should be examined carefully, as otherwise reinfections are bound to occur. In butterfly lupus of the face, where the nasal mucosa is also affected, the nose should be treated first and cured as much as possible before commencing diathermy treatment of the face.

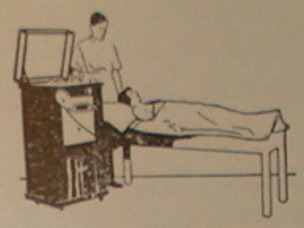
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J. G. Putnam, M. D., of Everett, Wash., offers:
To facilitate the opening and closing of the patient's circuit without the aid of a foot switch, and yet without using the hand switch on the cabinet, procure a "pull chain" socket and mount it near the right-hand side of the cabinet. Connect the socket by a double cord to the foot switch binding posts.

Screw a fuse plug into this socket. Tie a piece of twine to the chain (sufficiently long to be convenient to the patient) and the patient can shut off the current if ever necessary for him to do so. The operator will often use this socket switch in preference to the regular hand switch.

Physiotherapy in the Medical Department of the United States Navy

By Erik G. Hankansson, M. D., Washington, D. C.



In the naval medical service, physiotherapy now includes massage, medical gymnastics, hydrotherapy, radiant heat and light therapy, actinic ray therapy and electrotherapy. In the term medical gymnastics are included all the methods of systematic exercises of the motor apparatus for therapeutic purposes. Both the manual and the mechanical methods are used. Games and sport and occupational therapy are also utilized. In hydrotherapy, applications of practical nature and known effect are used, such as the ablution, the sheet-bath and the cold friction bath, the cold pack and the continuous bath, the circular douche, the jet and fan douche, whirlpool baths and fomentations. Radiant heat and light are applied by means of different types of incandescent lamps and by electric light bath cabinets. For actinic ray therapy, the mercury vapor quartz lamps and other arc lamps are utilized. Direct sunlight is also used. In electrotherapy use is made of the galvanic, faradic and sinusoidal currents and the various modalities of the high frequency current and static electricity.

In the latter part of 1919, a separate department for physiotherapy was established at the Naval Hospital, Brooklyn. A complete equipment was acquired. Navy nurses and hospital corpsmen were trained as operators and a high standard of skill was soon attained. The hospital staff found physiotherapy a valuable aid in the treatment of a great variety of injuries and diseases and utilized it to its full capacity. During the three years and a half that it now has been working, the change from wartime to peace time conditions has occurred and an entirely new set of officers and nurses has succeeded the staff under which the physio-

therapy department evolved. It is significant to note that the department still has practically the same extent of usefulness. This bears out the assumption heard from various sources nowadays that the utility of physiotherapy is not restricted to the functional restoration of maimed victims of war injuries, but that it should be regarded as a fundamental branch of medical and surgical treatment in time of peace as well.

The Bureau of Medicine and Surgery is now realizing a plan to place physiotherapy at the command of all naval hospitals. Three naval hospitals, besides the Naval Hospital, Brooklyn, have now physiotherapy departments in commission, and within the next six months five additional hospitals will be equipped and provided with trained personnel for this method of treatment.

The Navy does not employ reconstruction aides as operators in physiotherapy, but trains its own personnel, nurses and hospital corpsmen, for this purpose. This training is carried out at the Naval Hospital, Washington, D. C., where a physiotherapy department, with special advantages for training of personnel has been organized. The minimum time for the course of instruction is four months. The aim of this training of the nurses is to make them skillful technicians capable of intelligent application of physiotherapeutic measures, at the direction of medical officers. The hospital corpsmen are expected to meet these requirements only in hydrotherapy. Their training in the other methods of physiotherapy is considered satisfactory when they can work as reliable assistants to the nurses.

Physiotherapy has also been placed on the curriculum of the Naval Medical School. The course includes eight lectures with clinical demonstrations and eight hours of practical work. The training of the personnel and the instruction at the Naval Medical School are in charge of medical

officers who have had special experience in physiotherapy, and who have been afforded ample opportunities for study.

Through this system of instruction, the peace time Navy will soon have most of its medical officers familiar with the principles and indications of physiotherapy and a number of medical officers will have special knowledge of the subject and considerable experience in the training of operators. Furthermore, there will be many nurses particularly skilled in the application of the various modalities of physiotherapy, and a considerable number of hospital corpsmen sufficiently trained to work satisfactorily under supervision. It is obvious that these conditions will permit of a quick and easily accomplished expansion in case of a war emergency. By merely placing the above mentioned medical officers in charge of the various physiotherapy departments, each naval hospital can be made a training unit capable of supplying its own needs in physiotherapy personnel. With trained personnel available, the problem of expansion is practically solved. Other necessities, such as additional space and more equipment would be less urgent, since, undoubtedly, the skillful human hand working intelligently is the most important instrument.

—*New York Medical Journal, Aug. 4, 1923*

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There is nothing in physical therapeutics that the regular physician need apologize for, but the most of us should apologize for being ignorant of the possibilities of measures other than drugs in favorably influencing the many distressing conditions which afflict mankind.

□ □ □

There is no other means at the command of the physician so potent in correcting deranged metabolism as the high-frequency current.

Thermotherapy.—B. S. Price (*American Journal of Electrotherapeutics and Radiology*, January, 1922) summarizes as follows:

1. The unnecessary confusion existing with regard to the recognized distinguishing features and indications of the different forms of thermotherapy should be corrected as much unnecessary harm results from it. At the same time many lives are being destroyed through the lack of fulfillment of the possibilities.

2. Careless nomenclature used in the expression of the various forms of thermotherapy indicates its haphazard use and in the minds of many a confused and unrecognized conception of the distinguishing features. Heat brings about opposite results under different conditions, therefore definition is necessary. Human bakes do not exist in civilized communities.

3. The present degree of knowledge with regard to thermotherapy largely limits its application in therapeutics to the effects produced from the accompanying qualities of the modality rather than from the production of heat within the tissues except in the case of diathermy. Heat obtained from such active sources as radiation and electrical currents is accompanied in its effects by those of molecular massage and under high temperature, the initial stimulation more rapidly passes into depression than in the case of convective heat of high degree.

4. The different forms of thermotherapy, largely dependent upon their associated features, fill wholly different indications. Further, the results obtained vary widely even to the degree of antagonism dependent upon sudden exposure to high temperature or prolonged exposure to a low temperature and upon the mental and physical condition under which the patient is placed.

5. The significance of catabolic elimination requires more conscientious study than is generally recognized.

6. The oven bath properly given is a cellular waste eliminant and as such fills an entirely different indication from any other form of heat. It would seem to act mainly through the adrenosympathetic system. Oven bath stimulation is distinctly chemical in its last analysis of elimination and in no sense one of perspiration. Whereas other forms of heat may have a more marked influence upon metabolism under certain conditions, never do they markedly influence elimination. The oven bath is indicated wherever there is subelimination of toxic matters from the tissues, whether in the course of protein metabolism, as in nephritis, certain types of neuritis, rheumatism, etc., or in acidosis or other toxic conditions. It is also a valuable circulatory stimulant in these cases.

7. Cardiac incompetency is not a contraindication to the oven bath properly given.

8. In the use of superheated dry air as with other methods of modifying the circulation, it is important to maintain the circulatory changes thus produced until restored by Nature. Hence, the horizontal position is essential, and air cooling, as well as water cooling under improper temperatures must be avoided. Air cooling is impossible of regulation. Water regulation is possible.

9. The state of abeyance under which the cardio-vascular control is placed for a few hours as a result of the oven bath is followed by marked improvement in its tone over that preceding the treatment. This is evidenced by functional hypotension cases.

10. There is necessity for discrimination and proper combination of measures in this as in all forms of therapy.

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A man is not an electrotherapist just because he can replace a spark plug.

□ □ □

Quinine will often cure malaria; diathermy will just as often abort a pneumonia.

A PAGE OF FUN

A negro who had an injured head entered a doctor's office.

"Hello, Sam! Got cut again, I see."

"Yes, sah; I done got carved up with a razor, Doc."

"Why don't you keep out of bad company?" said the physician, after he had dressed the wound.

" 'Deed I'd like to, Doc, but I ain't got 'nuff money to git a divorce."



□ □ □

Another Ford Story.

Pa: "I've bought a new tin rattler for the baby."
Ma: "Why, John, it will be at least fifteen years before he will be able to drive a car!"

□ □ □

Literal Tom.

Tommie came to a word he couldn't pronounce during his reading lesson.
"Barque," said the teacher.
Tom looked sheepishly around the room.
"Barque, Tommie!" exclaimed the teacher sharply.
"Bow-wow-wow!" cried Tommy, completely dumbfounded.

□ □ □

Slow.

Jack: "Hadn't you better put something around you?"
Sylvia: Hadn't you?"—Life.

You Can Believe This One.

An alligator known to have opened its mouth but once a month has just died in Scotland. The natives have already entered bids for purses to be made from its hide.

□ □ □

Needed Cheering Up.

"You sold me a car about two weeks ago."
"So I did," replied the automobile salesman. "How do you like it?"
"That's just the point. I want you to tell me everything you said about that car all over again. I'm getting discouraged."—Birmingham Age-Herald.

□ □ □

A Doctor With a Bay Window.

Says a small advertisement: "To let, four rooms and bath, complete housekeeping apart, suitable for physician with two large storerooms." It might likewise appeal to some doctor with a bay window. —Judge.

THEY WRONG OPPORTUNITY WHO SAY SHE KNOCKS BUT ONCE.

FISCHER'S MAGAZINE

Fischer
CHICAGO, ILL.

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OCTOBER, 1923

THE MORE YOU KNOW,
THE MORE YOU KNOW
YOU OUGHT TO KNOW.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II OCTOBER, 1923 No. 1



This is the First Anniversary of Fischer's Magazine

A fine, robust, healthy chap for only one year of existence—don't you think so?

Well, just watch him grow!

He will continue to be fed on only the best, his habits are quite regular, and we fully intend that he be kept in the pink of condition.

On just what kind of diet do you think he would thrive best?

The Treatment of Calcified Subdeltoid (Subacromial) Bursitis by Diathermy

(*Abstracted Journal A. M. A., July 14th, 1923*)

Dr. Joseph F. Harris, M. D., Associate Physical Therapist, Mount Sinai Hospital, New York City, advises that in the majority of these cases the diagnosis is confirmed by the Roentgen ray, and that Diathermia is, without doubt, the most valuable treatment indicated * * * .

* * * It is a proved fact that the maximum intensity of heat is always developed half way between the two plates, and it is due to this that deposits such as occur in Bursitis can be readily attacked. Diathermia really creates a noninflammatory reaction in the affected part, and it is due to this physiologic action that absorption of foreign substances takes place.

Dr. Harris advises that the electrical plates be placed anteriorly and posteriorly on the shoulder, and that care should be taken that the affected bursa lies directly between; that experience has shown that 500 to 700 milliamperes of current should be employed; that the first treatment should last 15 minutes, and increased daily until one-half hour's time can be given. He also advises that if the patient is suffering severely treatments should be given every day for a week, and then on alternate days. His case reports, which follow, are very interesting.

REPORT OF CASES

Case 1.—Mrs. M. F., aged 43, for eight weeks had suffered continuous pain and was unable to raise her arm from her side. A roentgenogram showed a calcification, under the right subdeltoid bursa, which measured 1 inch in length and one-half inch at its greatest width. At the beginning of this trouble, all abscessed teeth had been removed. She received, in all, fourteen treatments, one every other day, and at the end of that period the pain had disappeared and the motion of the arm was normal. I have been able to keep track of this patient for two years, and at no time has she complained of shoulder disability.

Case 2.—H. A. S., a man, aged 36, complained of occasional pain and slight disability only when doing certain acts, such as removing his hat or tying his tie. In this case roentgenograms confirmed the diagnosis by showing a small deposit in the right shoulder subacromially. This measured about one-fourth inch in length. At the end of fifteen treatments all the symptoms had entirely disappeared. Two months after, the patient returned for more treatment, having put excessive strain on his right arm. Owing to the irritated condition of his shoulder, it was necessary for me to give him twenty-five more treatments, but he has been free from all symptoms for over a year. In all fairness, I want to state, with reference to this case, that the average person would not pay much attention to the symptoms presented during his last course of treatment, but this man, being highly neurotic, was quite prone to exaggerate the slightest twinge.

Case 3.—H. B., a man, aged 74, was unable to dress himself, owing to pain and inability to move his shoulder. The case presented the usual symptoms and roentgen-ray findings. Before the roentgenograms were taken, the patient had been treated for arthritis. He received a daily treatment for seven consecutive days, and then was able to go to his home in the South, with no pain and no shoulder disability.

Case 4.—Mrs. M. S., aged 53, came for treatment after having been treated in the hospital for three days, with the arm in abduction. The roentgenograms revealed a deposit subacromially in the right shoulder. Pain was a constant symptom, as well as partial limitation in the shoulder joint. The patient required twenty treatments, but at the end of that time she had the full use of her shoulder joint and was free from pain.

Case 5.—F. F. S., a man, aged 42, was carrying his right arm in a sling and was suffering so acutely that it was necessary to undress and dress him, when I first saw him. The findings were of the usual type. The patient received seven consecutive treatments. After the first three, he was able to sleep at night without the use of drugs, and at the end of seven treatments, all symptoms had disappeared.

Case 6.—H. H., a man, aged 38, was found, by means of the roentgen rays, to have deposits in both shoulders nearly the size of a robin's egg, an unusual condition. Surgical intervention had been advised, since he was unable to raise either arm from the side. Owing to the stress of business affairs, he could not take

the time necessary for the operation. He received on each shoulder twenty-one treatments and, at the end of that period, he was able to raise both arms to the level of his shoulders. As his main purpose was to evade operative procedure, he discontinued treatment at this stage, evidently being satisfied with this improvement.

Observations of results indicate that when employing this method of treating Subacromial Bursitis about 80 per cent of the patients recover, and that the remaining 20 per cent either discontinue treatment or are not helped. The treatment is not painful, and as in most instances the patients have been advised to have this calcification removed surgically, it is readily seen that Diathermy is to be tried first.

Diathermy in Hypotension

By Elnora C. Folkmar, M. D., Washington, D. C.

There is a class of cases that gives the physician even more trouble than the high blood pressure cases. These complain of chilly feelings, have cold hands and feet, no appetite, insomnia, mental depression, no energy, lack of physical strength. They have low blood pressure and subnormal temperature. For these cases diathermy is a very rational treatment, per se, or as an adjuvant to endocrine, diet, or drug therapy. Diathermy gives the thermogenic mechanism a rest, by supplying the heat which the body cannot produce, and thus permits it to resume normal functioning. Daily treatments of fifteen minutes to one-half hour should be given on the condenser chair or pad. Use 500 to 800 milliamperes of current. At first, special care must be taken not to give too vigorous a treatment or the patient may faint. The oral temperature should be taken before and again after treatment. There should be an increase of .5 to 1.5 degrees. When the patient retains the increase in temperature until the next day, treatments may be given on alternate days.

Some Uses for Diathermia

C. S. King, M. D., Washington, D C.

The chief use of Diathermia is in deep-seated conditions as distinguished from superficial ones. These conditions are such as joint affections, bronchitis, pneumonia and tuberculosis (both pulmonary and laryngeal). It is also useful in absorbing scar tissue, such as over deposit of bone scar after a fracture. In such cases, however, it must be used with caution, as in one of my cases, in a delayed union, we overtreated and absorbed some needed scar tissue that had been deposited.

While we are on the subject of bone tissue it is well to suggest that a number of mild treatments, say of 10 minutes at 300 to 600 milliamperes, according to the thickness of the section of body treated, is stimulating to the formation of normal tissue; while a long, heavy treatment such as one hour at from 600 to 1500 milliamperes tends to absorb tissue and to sterilize, as is needed in pneumonia, bronchitis, tuberculosis, adhesions, etc.

If you will get firmly fixed in your mind that Diathermia is relaxing, deeply sterilizing and absorbent in effect, while the monopolar or Oudin is stimulating and superficially sterilizing and absorbent, you will have a clear-cut indication for each modality from your high frequency apparatus.

For instance, if you are treating a cold in the head, or a muscular lameness, or a recent injury, the monopolar (Oudin) current is the desirable one. It is wonderful how much it helps take out the soreness from a sprain as in the ankle or the knee, or the back, or an intercostal rheumatism; but, if you have a joint injury, or a congestion or inflammation deep within the body, in the intestines or in the pelvis, Diathermia is indicated.

The more severe and acute the condition, the longer should be the treatment—say one hour, as in bronchitis, pneumonia or in pelvic cellulitis. In tuberculosis, however, use about

a half hour's treatment daily or every other day, as the case improves. Cod Liver Oil should always be given with tubercular conditions as it supplies the greatest amount of fat-soluble vitamins available from any fat, and rebuilds lung tissue. I use Scott's Emulsion as the more agreeable form, but pure Norwegian Cod Liver Oil is better if it is tolerated by the patient.

If you have not the actinic rays available, as furnished by the air-cooled mercury vapor lamp, it is well to use a 1000 watt or 1500 watt lamp in connection with your tuberculosis cases. Follow the Diathermia with a gentle vibratory treatment over the same area lasting about 7 minutes—2 minutes over front of chest and 5 minutes over back of chest and on down the spine, avoiding the spinous processes. In acute cases treat two or three times daily. In chronic cases daily or every other day.

If there is persistent pricking under the pads in Diathermia, it means either that the metal plate has not been smoothly applied to the skin, or that there are breaks or poor connections in the cords or in the machine. Care should be taken that there are no sharp points, as on the edges, touching the patient, otherwise there will be a persistent pricking effect. There should be no sensation except that of a gentle warmth (and that more of a body warmth than surface) while taking Diathermia.

Patients are apt to drowse off, as the treatment is relaxing and comforting; also, as they usually perspire, they must be protected by covering and wiping off vigorously following the treatment.

I always tie a stout cord to the switch that breaks the current, and have my patient hold this string. If anything happens to cause a burning or biting sensation from the Diathermia, due to a broken contact somewhere, the patient can open the switch immediately and not wait for help. Otherwise there might be a skin burn that leaves an unpleasant memory. Diathermia is the most powerful treatment we

IN PREPARATION

DIATHERMY
& ITS APPLICATION TO
PNEUMONIA

BY

HARRY EATON STEWART, M.D.

Attending Specialist in Physiotherapy, U. S. Marine Hospitals, N. Y.; Consultant in Physiotherapy, U.S.V.B. Hospital, New Haven, Conn.; Director, New Haven School of Physiotherapy; Formerly Assistant Director, Section of Physiotherapy, Office of the Surgeon General, U. S. Army, and Supervisor of Physiotherapy, Bureau of U. S. Public Health Service, Washington; Author "Physical Reconstruction and Orthopedics"

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use in the office, and at the same time it gives the least trouble and sensation when properly applied.

Do not be misled by anyone telling you to employ *wet felt pads* for Diathermia. Never use anything but *bare metal material, preferably mesh.* I buy in ten-pound lots. The Flexible Mesh material and Pads as made by H. G. Fischer & Co. are excellent. The objection to the use of a wet felt pad is that the heat of the Diathermia treatment causes steam to form which is apt to burn your patient at the surface, which is in itself an entirely different treatment from the deep action of the Diathermia as has been described in the foregoing.

Also, if the treatment is long continued, these wet pads dry out in spots, which causes the current to concentrate in what wet areas remain, and burning will again result. It is extremely bad technic to use wet felt pads, and I have protested to the manufacturers against permitting their agents to recommend them. All experts in Diathermia will confirm this recommendation of the use of bare metal plates. The plates and the patient's skin must always be well moistened with warm soap lather.

Major C. M. Sampson, M. D., formerly of the U. S. Army and later of the U. S. Public Health Service, but recently resigned from government service, has written a splendid book on Electro-physiotherapy subjects. You should get one of these books, entitled "Physiotherapy Technic." Major Sampson has probably treated a larger number of patients by these methods than has any other person. As many as 50,000 to 60,000 each month were treated in his clinic at Fox Hills, Staten Island, N. Y., where he was stationed during the war and after in the reconstruction period.

IN PREPARATION

DIATHERMY
& ITS APPLICATION TO
PNEUMONIA

BY

HARRY EATON STEWART, M.D.

Attending Specialist in Physiotherapy, U. S. Marine Hospitals, N. Y.;
Consultant in Physiotherapy, U.S.V.B. Hospital, New Haven, Conn.;
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Director, Section of Physiotherapy, Office of the Surgeon
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PUBLISHER'S NOTE

The author has had two years' experience in the treatment of pneumonia with diathermy in U. S. Marine Hospital, No. 21 (Staten Island), where every case was checked up by the full clinical and laboratory findings of the staff. The results obtained were as startling as they were gratifying.

In the Introduction Dr. Stewart acknowledges that the results obtained by some of his co-workers have surpassed his own. This would seem to indicate that the profession in general should duplicate or better the results reported.

The author insists that "hit or miss methods will not obtain good results in this work any more than they will in any other therapy or surgery." He has therefore written an unusually clear, but at the same time condensed, description of the physics, physiological effects and therapeutic indications of both medical and surgical diathermy. Technique is described with unusual clarity.

Particular emphasis is laid on the fact that diathermy properly applied is harmless under all conditions and that it brings almost invariable symptomatic relief. Above all *it has apparently lowered the general average mortality*. This lessened death rate was particularly evident in a carefully worked out comparison with a group of controls under conditions identical in every respect, except in the use of diathermy.

A large number of detailed case reports giving all the clinical and laboratory findings—the most conclusive evidence that a scientist can offer—are given in this book.

Practically every aide, nurse and physician who has actually seen the treatment *properly* given has expressed faith in diathermy as a therapeutic adjunct of distinct value in pneumonia.

The book will be profusely illustrated, well printed and well bound.

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PREFACE

INTRODUCTION

Beginnings of Modern Physiotherapy. Mass Experience in Government Service. Widening Scope of Application. Special Value of Diathermy. History of Its Application to Pneumonia. Rationale of the Treatment. Plan of Case Reports. Controls. Type of Apparatus.

CHAPTER I. GENERAL DIATHERMY TECHNIQUE

Definition. History of D'Arsonval Current in Medicine. Accomplishment of American Workers. Application to War Injuries. Recent New Indications. Physics. Derivation. Character. The Condensers. Spark Gap and Its Proper Care. The Milliampere Meter, What It Indicates. Physiological Effects. Local. Circulatory Changes in the Current Pathway. Systemic Effects. Experiments. Deductions. Apparatus—Essential Features. Electrodes—Types, Preparation. General Technique. Special Regional Technique. Treatment Precautions. Contraindications.

CHAPTER II. SURGICAL DIATHERMY

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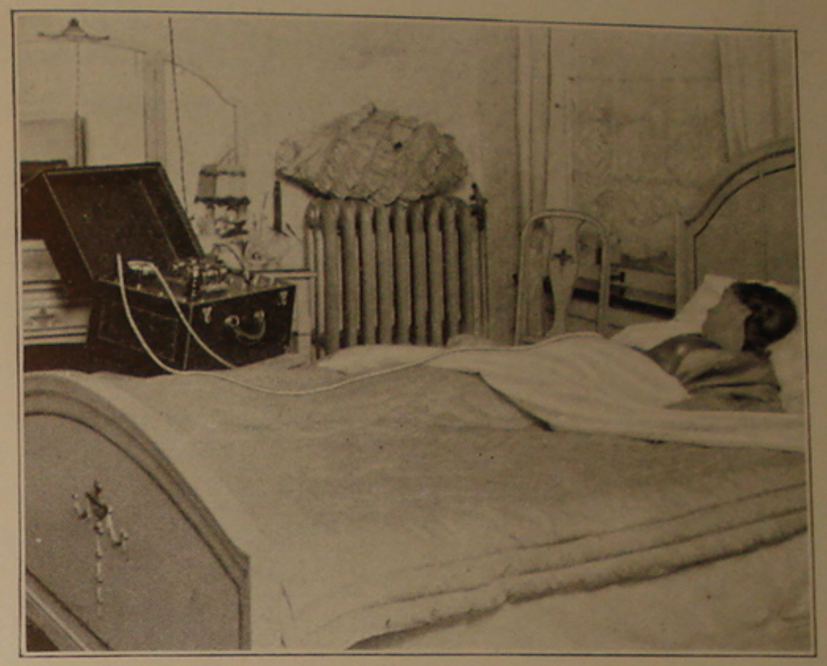
DR. HARRY EATON STEWART, of New Haven, Connecticut, says, in concluding a very interesting paper on the treatment of Pneumonia with the Diathermy Current in which he recounted a number of case reports:

"In several of the cases the Diathermy was not instituted until in favorable cases the temperature might be expected to start downward, but it is the opinion of the medical staff at the U. S. Marine Hospital No. 21, New York City, who selected these as test cases, that Diathermy helped in their recovery.

"When we have had many more cases to report on, we hope to be able to make a more definite statement, but this much we do know—that in *every single case* and in almost *every single treatment* the temporary effect upon the patients was remarkable. Cyanosis disappeared. The expiratory grunt when present was remarkably lessened or stopped entirely. Respirations were less labored and the patient received from two to four hours of very marked relief, in many cases obtaining some sleep.

"Now Diathermy has been ordered as soon as the diagnosis is made in every case of Pneumonia at the Marine Hospital. It is not too much to assume that in many critical cases this marked relief of symptoms may be the turning point in disease.

"Under proper technic there is no danger of ill effects from two or even three Diathermy treatments per day. The proper technic is of the greatest importance. The fall of temperature takes place by lysis where Diathermy is used. Pneumonia attacks all ages, and the rugged as well as the weak. The death rate is so high that any method of treatment which will lessen it to any extent is invaluable. *The results of this work are sufficiently encouraging to justify the wider employment of Diathermy in this disease.*"



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Correct Auto-Condensation Technic

In response to a question on the subject, our good friend Dr. Burton B. Grover, of Colorado Springs, advises:

"While many methods have been advocated for employing the D'Arsonval Auto-Condensation current for the reduction of high blood pressure, the correct procedure is—Patient on either couch or chair pad, reclining if possible; metal handle held firmly in both hands; pass from 300 to 500 milliamperes for 13 to 15 minutes.

"The dose should never exceed 700 millis at any time when given to reduce blood pressure. With metal handle in the hands the blood is heated gradually and the effects are more lasting. Just who introduced the method of placing a large electrode on the chest, abdomen, or both in Auto-condensation, I cannot say, but frankly I do not approve. The electrode in this position does not administer Auto-condensation at all; it is indirect Diathermy, and is advisable in cases of bronchitis, etc.

"When a kidney is to be treated, one electrode should be placed over the kidney, the other on the abdomen directly opposite. There is no excuse for treating a kidney by the indirect method; it should always be treated *directly*. The blood pressure reduction is one of the incidents to this method.

"High milliampereage is undesirable in Auto-condensation, but generally of extreme importance in Diathermy. I see no good reason for hands and feet being connected, with the auto pad as the other terminal. However, I see no objection. Hand-and-foot Diathermy is desirable in some cases for its effects upon general metabolism.

"Always advise the neophyte to never exceed 700 milliamperes in Auto-condensation treatments. Large doses will do more harm than good, and throw a monkey-wrench into a perfectly good therapeutic measure.

"I have administered thousands of Auto-condensation treatments, and have learned the advantages as well as the follies of this end of the High Frequency game."

Visceral Adhesions

Frederick M. Morse, M. D., Boston, Massachusetts

Visceral adhesions arise from so many different causes that the etiology must always be considered before any intelligent procedure should be undertaken for relief.

Adhesions following surgery about the duodenum, gall bladder, and appendix regions, where a purulent condition existed previously, is usually to be preceded and followed by post-inflammatory fixed areas where surgery perhaps offers the only solution.

Many apparent adhesive conditions that are diagnosed by tenderness, pain, and X-ray diagnosis at abnormal angles and distentions about the hepatic, splenic, and sigmoid flexures of the colon are often elusive.

In lieu of a Wasserman test, the iodides and mercurials are often given to establish a diagnosis. Likewise, mechanical gymnastics intelligently applied often changes an apparent surgical case into a non-surgical case, which might apply to the stomach, duodenum and colon more especially.

Adhesions following plastic peritonitis is a regenerative process and is often followed by the formation of firm adhesions which in time may disappear. Electrical and mechanical treatment in these cases usually hasten recovery.

The process that may be instituted with safety where there is no purulent area intervening is the application of diathermy directly through the part under consideration, or mild currents of galvanism followed by wave current effects with an alternating current. This latter procedure increases cell activity and favors elimination of retained infiltrations.

The reversing of the galvanic current as may be done by the sinusoidal apparatus would, in the opinion of the writer, often result in exhausting the vitality of the parts that we hoped to regenerate.

The Proper Application of Mesh Diathermy Electrodes

Questions received in our daily mails indicate, both from the quantity as well as the nature of the contents, that an article pertaining to the proper method of applying *Mesh* electrodes is quite in order.

There are two distinct methods of applying both the mesh and block tin electrodes when employing Diathermy—the *plate* method and the *cuff* method.

For all flat surfaces, as for example on the trunk, the plate method will be found most convenient and adaptable. Coat the skin and the under (smooth) side of the mesh with warm soap lather. Place the mesh perfectly flat on the skin, with no wrinkles or high spots, and retain in place with a flexible, half-filled sand-bag.

Do not use a sand-bag of the heavy, bulky, thick variety that will slide off at the first move of your patient, but one carefully designed for the purpose. This is made of a strip of heavy cloth or light canvas about 10 inches wide by 20 inches long, folded over lengthwise to form a bag 5 x 20 inches. Sew cross seams 5 inches from each end to form two pockets, each 5 inches square. Use only sufficient sand to half fill these two pockets, leaving the center strip flat. When this bag is placed over your patient the flat part only bears on the electrode—the weights hang down at the sides. The weight of the patient will hold the under electrode in place, and the half-filled sand-bag is laid over the upper electrode. Slip one of the small connectors on the tip at the end of the rubber covered cable, and place this connector between the mesh and the sand-bag. No fastening is required either underneath or on top.

The cuff method, however, should always be employed when treating a joint, such as the knee or elbow. Use two pieces of mesh 3 inches wide and sufficiently long to pass all around the limb with a slight overlap. Coat the skin and the

under (smooth) side of the mesh with warm soap lather. Place one cuff five inches below the joint and the other five inches above. Hold these cuffs in place with two turns of a good elastic bandage, tucking the end under the first layer to prevent unwinding.

Bind sufficiently tight to prevent slipping, but always make allowance for the natural swelling of the part under the Diathermy heating to prevent any restriction. Pass your finger between the mesh and the bandage and insert the connector which in turn is fastened to the end of the rubber covered cable. This makes perfect contact and will not slip.

Dr. Gustav Kolischer—Again

Brief, But to the Point, as Usual

Diathermy is practicable in all instances in which heat produced within the tissues of the human body appears to be desirable as a therapeutic factor.

This item of generating the heat within the tissues is the paramount advantage of Diathermy over any other method. Heat applied to the surface of the body by means of a hot water bag or an electric pad penetrates to a very limited depth only, and cannot be regulated.

With the help of Diathermy we are in a position to administer heat wherever it is desirable, and to any area—superficially or to any desired depth. The degree of heat produced may be gauged and regulated within any limits desired.

To distinguish between Medical and Surgical Diathermy, the former term applies to any heating within physiological limits while the latter is applied to destructive heating, for desiccating structures—as tumors.

Medical Diathermy is used to advantage in all instances where absorption is intended, or where localized increase of the blood supply is desired. Therefore, Diathermy is used

for the treatment of all exudates; for instance, in arthritis, pleurisy, pneumonic infiltrations, indolent parametric exudates, and in chronic prostatitis and vesculitis.

For destruction of superficial benign growths the Surgical Diathermy is used in the form of Fulguration; that is, using the Electric Spark.

More substantially, malignant tumors are desiccated (or coagulated) by the use of larger stamp-shaped electrodes that are brought in intimate contact with the growth. One may either catch the tumor between the two active metallic electrodes, sending the current directly through in various diameters, or apply an inert large electrode somewhere on the surface of the body and press the active electrode upon the growth to be coagulated. Here again the superiority of Diathermy, by virtue of the possibility of exactly gauging the extent of destruction, and by the orderly procedure of the whole manipulation; the degree of penetration being entirely under control.

Technic of Diathermy and Indication for Its Use

R. Grunbaum (Wiener klinische Wochenschrift, January 11, 1923) has improved his technic of diathermy therapy of chilblains to such an extent, that he uses this treatment even in the severest cases of frostbites. For example, have the patient place the tips of his toes in running water and apply the other electrode to both thighs, with the result that the current flows from the tips of the toes through the entire leg and thus affects a large vascular area. In addition to frostbites a suitable field of diathermy treatment are the diseases of the accessory nasal sinuses, cicatricial bands and abdominal adhesions; also chronic parametritis and perimetritis.

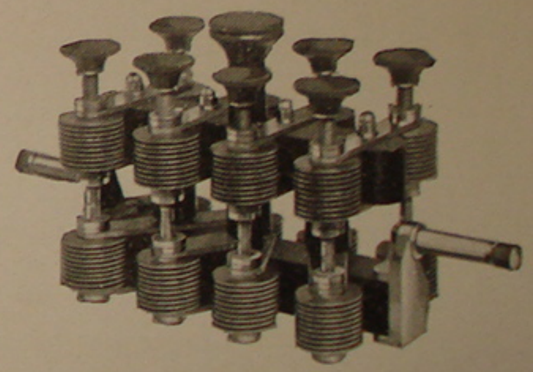
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A PAGE OF FUN



Young Bride (timidly): "Eh—I'm not joking—eh—I mean I really want to buy some—quite seriously—eh—might I ask if you have any bananas?"

□ □ □

Young Wife—The postoffices are very careless sometimes, don't you think?

Friend—Why do you think so?

Young Wife—Fred sent me a note yesterday from Philadelphia where he is stopping on business, and the silly postoffice people put an Atlantic City mark on the envelope.

□ □ □

The melancholy days are here,
And there's a darn good reason;
The overcoat I wore last year
Won't stand another season.

□ □ □

"Ma, if the baby was to eat tadpoles, would it give him a big bass voice like a frog?"

"Good gracious, no! They'd kill him."

"Well, they didn't."

Little Sally—"When I get to be mamma, will I have a husband like papa?"

Mother—"Yes, dear."

Little Sally—"And if I do not get married, will I be an old maid like Aunt Kate?"

Mother—"Well, I guess so, honey."

Little Sally—"Well, I guess I am in a fix, mamma."

□ □ □

Young Brown, who had been married but a few days, sought out his friend, Jones, who was a family man of long experience, for a little advice.

"Jim," said Brown, "what did you call your mother-in-law after you got married?"

"Well, I'll tell you," replied Jones, "for the first year I addressed her as 'Say,' and after that we all called her 'Grandma'."—Judge.

THE PRACTICAL MAN KNOWS HOW—
THE SCIENTIFIC MAN KNOWS WHY—
THE SUCCESSFUL MAN KNOWS BOTH.

FISCHER'S MAGAZINE

DECEMBER
1923

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Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II DECEMBER, 1923 No. 3

Christmas emphasizes many truths to all of us

True friendship is one of the world's richest blessings. Kindness melts away frowns, scowls, worries, hard feelings. Real happiness comes through making others happy.

It gives us great pleasure to extend to you, doctor, our choicest good wishes this Christmas period.

May every minute of the day fairly tingle with good cheer.

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DOCTOR—are you interested

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In getting the other fellow's viewpoint?
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The second Wednesday of each month hereafter will be set aside at the Fischer Plant for demonstration and clinic purposes.

This is being done as a result of numerous suggestions from our readers and we feel sure there will be a hearty response. You are welcome any day—every day—come when you can—but this one day each month is to be "Physician's Day." You will be assured of hearing at least one good talk, seeing several demonstrations, clinics when possible and advisable, and a program of interesting events throughout the day.

Help us—come in if you can, or send us some of those questions that come up so often and let's thrash them out at these meetings. The answers, when of sufficient import, will be published in these pages and all interested may benefit therefrom.

Individual subjects will be assigned to certain physicians and proper announcement made in these columns regarding the coming month's program.

Now Doctor—don't leave everything to the next fellow—let us have YOUR opinion. How does this suggestion strike *YOU? ?*

Instructive Successful Results in Fourteen Successive Cases of Pneumonia Treated with Diathermy

Marked Relief from Cyanosis and Painful, Labored Breathing Immediately Following Treatment

Does Not Interfere with Other Lines of Treatment

By Henry V. Broeser, M. D.
105 Newark Street, Hoboken, N. J.

Decongesting the Congested Lung

In the treatment of pneumonia we aim to decongest the congested lung by counter irritation, cupping, application of heat to the chest and the like. There is no reason why diathermy should not accomplish as much as Dr. Broeser claims, and more. This is shown by the series of instructive cases presented in this interesting paper.—Eds.

DIATHERMY is a form of physical therapy in which the generation of so-called internal heat is utilized. When a rapidly alternating current of electricity (high frequency) is conducted through resisting tissues, heat is generated along the path of conduction in proportion to the strength of the current and the resistance of the tissues. The current of electricity changes its direction so rapidly that excitable tissues are not stimulated nor does ionization or electrolysis occur. This form of heat because it originates within the tissues and is not brought from without as in the application of heated objects or thermic lights is called internal heat or diathermy.

The rationale of the use of diathermy in disease depends upon the well-known fact that any measure which supplies heat to a part or raises the temperature en masse will cause

a dilatation of the capillaries with resulting hyperæmia; increased cell nutrition and acceleration of the chemical reactions constituting the cell metabolism of the part and hence increase the "locales resistiones" which will also allow for a more rapid drainage from that part.

High Frequency Treatment in Medicine—Surgery—Pneumonia

The use of high frequency currents in medicine was first suggested by "Nikola Tesla" in a paper in the *Electrical Engineer*, December, 1891. The physiologic properties of these currents were investigated in a series of researches by D'Arsonval in 1898. In Sept., 1907, Nagelschmidt, a Berlin physician in Dresden, stated that high frequency currents caused a "heating through" of the tissues and recommended their use in the treatment of joint and circulatory diseases. Since then there has appeared a considerable literature on the use of high frequency in medicine and surgery. Little attention was paid to the reports of its use in pneumonia, since for the most part they were deficient in laboratory, clinical and X-ray data to make the records convincing. In October, 1922, Dr. H. E. Stewart, of the U. S. Public Health Service, reported a series of ten cases of pneumonia occurring in the U. S. Marine Hosp. No. 21, New York, in which diathermy was employed. All the patients except one recovered by lysis. The single fatality was a case of bilateral pneumonia, empyema and streptococcic septicemia.

The writer does not wish to imply that in diathermy there is a specific for pneumonia, the following is merely a record of his experience with this therapeutic agent in fourteen successive cases of pneumonia. These cases were taken from his consulting practice as Roentgenologist and Physiotherapist to St. Mary's Hosp., Hoboken, N. J., St. Francis Hosp., Jersey City, and North Hudson Hosp., at Weehawken, N. J. The physical findings and diagnosis in each case was made by the physician in charge who prescribed medical treatment in conjunction with the diathermy which was

administered by the writer. Radiographs were taken in the beginning and in the course of the treatment to determine the influence if any, on the rate of resolution of the consolidated lung.

Summary of Procedure

Flexible electrodes, 4x7 inches composed of blocked tin gauge 22, are placed one anteriorly right, the other posteriorly left, over the part of the chest corresponding to the pneumonic lung. A hot shaving soap lather is applied to the electrodes and the skin. A bed sheet folded one foot wide placed around the chest supports the electrodes. Under the posterior one a small cushion is placed to allow more comfort to the patient. The machine used is of the portable type capable of registering 4,000 M.A. of current. The current is slowly turned on until the maximum M.A. is reached, allowing about four to five minutes for this procedure. By the maximum is meant the strongest current the patient will tolerate, usually between 1,500 and 2,000 M.A. For 20 minutes the current flows, then it is gradually reduced to zero, allowing three minutes for this procedure. *Best results are followed by the early morning treatment.*

Case Presentation

1. Case of *Dr. Pyle* and *Dr. Kerdasha, St. Francis Hosp.* C. B., male, white, 39 years, laborer.

Past History: Pneumonia at the ages of 20 and 32, no sequelæ.

Present Illness: On March 22, patient was seized with a pain in the left side, chill, sweats, headache, cough and shortness of breath.

Physical Exam.: Nutrition of patient very poor, marked cyanosis, lower left chest shows dullness, increased tactile and vocal fremitus, rales and bronchial breathing with pectoriloquy. Temp., 104; pulse, 120; resp., 40; blood pressure, 106-40.

Lab.: W. B. C. 14,000 Type Pneumonia IV.

X-Ray: Lower left lobe is dense and cloudy. On the fourth day of the disease diathermy was started. The patient received four treatments and made an uneventful recovery by lysis.

2. Case of *Dr. Klein, Middlesex General Hospital, New Brunswick.* F. K., female, white, 29 years, housewife.

Past History: Measles, scarlet fever and diphtheria as a child, no sequelæ. Recurring attacks of tonsillitis, otitis media.

Present Illness: On March 25 patient complained of pain in the chest, cough and headache. Entered the hospital March 26.

Physical Exam.: Patient is delirious; there is cyanosis, marked dyspnea, involuntary passage of stools and urine. Temp., 104; pulse, 120; resp., 48. Dullness over the entire left lung, rales, bronchial breathing.

Lab.: W. D. C. 23,500, R. B. C. 4,000,000 Hb 70%, P. 77%, S. L. 18%, L. M. 2%, T. 1%, E. 2%. Type 2 as shown by mouse inoculation.

X-Ray: Entire left lung dense, obliteration of the left diaphragm and costo-phrenic angle. Diathermy was instituted March 28. Temperature started down by lysis immediately. Recovery was uninterrupted. Sequelæ: otitis media.

3. Case of *Dr. Spath, Hoboken, N. J.* V. G., male, white, 35 years, houseman.

Past History: Unimportant.

Present Illness: On March 28 there was chill, pain in the chest and cough.

Physical Exam.: Patient is delirious. Temp., 104; pulse, 140; resp., 40. Over the right lower lobe there is dullness, increased fremitus, rales, bronchial breathing and pectoriloquy.

Lab.: W. B. C. 26,400, R. B. C. 4,240,000 Hb 85%, P. 81%, S. L. 14%, L. M. 2%, T. 2%, E. 1%. Sputum negative for T. B. Type Pneumonia IV.

X-Ray: Lower right lobe is dense, there is an obliteration of the diaphragm and the costophrenic angle.

Diathermy was started on the sixth day of the disease. The patient received two treatments per day for the next five days. Following the first treatment the temperature began to go down by lysis. Subsequently empyema developed, for which patient was operated upon and recovered.

4. Case of *Dr. Spalding, North Hudson Hospital, Weehawken, N. J.* A. B., female, white, 33 years, nurse.

Past History: Unimportant.

Present Illness: On March 14 patient complained of chill, pain in the chest, cough and prostration.

Physical Exam.: Patient is obese and cyanotic. There is marked abdominal distention. Temp., 104; pulse is intermittent and 112; resp., 32.

Lab.: R. B. C. 3,900,000 Hb 60%, W. B. C. 6,000, P. 90%, S. L. 16%, L. M. 4%.

There is dullness, increased fremitus, rales and bronchial breathing over the upper and middle right chest anteriorly.

X-Ray: Clouding of the upper and middle right lobes.

On March 20, the sixth day of the disease, diathermy was begun. Patient made an uneventful recovery by lysis.

5. Case of *Dr. Opdyke, Jersey City, N. J.* P. W., male, white, 26 years, auto salesman.

Past History: Pneumonia, 1921.

Present Illness: Patient complained of chill, headache and cough.

Physical Exam.: Patient is delirious and cyanotic, abdomen is distended with gas. Temp., 104; pulse, 110; resp., 40. There is dullness, rales and bronchial breathing over the right lower chest.

X-Ray: Right lower lobe dense. Obliteration of costophrenic angle.

On the fifth day of the disease diathermy was started. Recovery by lysis complete.

6. Case of *Dr. Londrigen, Hoboken, N. J.* A. E., female, white, 42 years, housewife.

Past History: Negative.

Present Illness: Pain in the chest and labored breathing on March 12.

Physical Exam.: Temp., 103.8; pulse, 116; resp., 32. There is dullness, rales and bronchial breathing over upper and middle part of the right chest.

X-Ray: Clouding of the upper and middle part of the right lower lobe.

On the fourth day of the disease diathermy was instituted. Temperature immediately dropped by lysis.

7. Case of *Dr. Spath, Hoboken, N. J.* A. W., female, white, 24 years, housewife.

Past History: Pneumonia, 1918.

Present Illness: On March 31 patient complained of chills, headache and difficulty in breathing.

Physical Exam.: Temp., 104; pulse, 140; resp., 44. Patient is markedly cyanotic and restless. There is dullness, rales, bronchial breathing and pectoriloquy left lower chest.

Lab.: W. B. C. 19,200, P. 86%, S. L. 8%, L. M. 1%, T. 5%. Pneumococcus Type 4.

X-Ray: Clouding left lower lobe.

On the third day of the disease diathermy was started and temperature began to recede immediately by lysis. Recovery uneventful.

(We will mail you copy on the remaining seven case reports on request.)—H. G. Fischer & Co., Inc.

Comment

Following the use of diathermy in thirty cases, fourteen cases of lobar pneumonia are recorded, the temperature immediately fell by lysis within a few days. The ages of the patients treated ranged from 2½ to 72 years. Most of the cases presented poor prognosis as cyanosis, tympanitis, low blood pressure, incontinence of feces and urine, obesity and comparatively low leukocytic reaction. In all the cases

(*Continued on page 10*)

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immediately following the treatment there was noted a marked relief from *cyanosis and painful and labored breathing*. The patients rested well, the majority sleeping a few hours. The evidence at hand however is insufficient to draw any justifiable conclusions as to the influence of diathermy in pneumonia. The author hopes that this therapeutic agent will receive a more thorough scientific investigation as to its merits and a more *universal* and *early* use with a view of determining whether it has a place in the treatment of pneumonia.

Controversy as to priority of claim and use of machines can be regarded as inconsequential. My answer is, that the physician treating the most number of cases with the best results following scientific steps as to history, blood pressure, blood count and radiographic examination (without undue handling of the patient while taking the radiograph as a rule the anterior posterior position is the only one that can be taken) followed by diathermy every one, two or three times daily according to severity. *The earlier the case is started on the diathermy the better the results*. If animal experimentation can be carried out, so much the better. Urine and also the sputa should be obtained as soon as possible to ascertain the type of the pneumonia.

As to the high frequency machine it should be one capable of producing 2,000 M.A. at a short damp spark gap regardless of the manufacturer, and there are many machines on the market not capable of doing this, thus useless in this particular line of work. It is known that the larger the spark gap the more interruptions, thus more farridism and voltage with annoyance to the patient. What we want in the treatment of this disease is heat sent into the lung substance, a painless process.

I do not believe that diathermia is a specific in the treatment of pneumonia, but do believe and know that it is supportive in character, it does not interfere with any line of treatment. All I ask is that the profession prove its usefulness. The results in these cases were all good, ages ranging from two and a half years to seventy-two years of age.

Electrotherapeutics in Urology

Victor Cox Pederson, A. M., M. D., F. A. C. S., New York

(*Abstracted from the New York Medical Journal*)

* * * Lincoln said that the only people he did not like were those he did not know. Most physicians seem guilty of not liking any new method of treatment which they do not know. Conservatism, reserve and caution are sound when based on a willingness to study, try and then judge. But blind prejudice, radical denial and arrogant complacency with methods already in vogue are unsound, because they have again and again been the bases of cults which have in the end compromised the medical profession. * * *

Like Lincoln's new friends, most of us like new methods after we have learned them. A familiar example is that the medical departments of the United States actually ignored and refused to adopt physical methods of all kinds—until they knew them through the result among the European forces. The Government has learned the worth of a new friend—Physiotherapy * * *.

Electrotherapy, which is only one department of Physiotherapy, can no longer be repudiated. Those who deny its value will soon be like the professor of 1850 in his disregard of the atmoic theory. Those who regard it as a quick cure-all will be like the dupes of the promoter whose financial bubble bankrupts them.

Diseases are processes, hence there can be no sudden and absolute reversal of the processes by any means whatever * * * .

High Frequency and Alternating Current are synonymous terms, applied to rapidly oscillating current converted into heat by resistance overcome, and by molecular activity in living tissue. Local and general Diathermy are only manifestations, hence a definite quantity of heat may be developed

in a part such as the prostate. The heating is vascular, nutritional and relaxing.

The source is a standard transformer delivering high potential current * * *, the rheostat, the Multiple Spark Gap. * * * The electrodes are of the high vacuum glass type for the Oudin (mono-polar) current, in rectal or urethral prostatic work; or the insulated tip rectal electrode with the large metal pad on the tubes if Diathermy current be employed.

The current should produce only a mild warmth. The milliampere meter registers from 200 to 1000, within tolerance. Treatments persist from ten to twenty minutes on alternate days, and decongest the gland remarkably.

In modern urology Diathermy is used to increase healthful hyperemia and nutrition whenever any other modality might be used. It therefore augments the action of any other modality if used first. General Diathermy or Auto-condensation in prostatic lesions promotes absorption and elimination. * * *

Electrotherapy is by no means a cure-all in urology. Improved appliances, better diagnosis, finer selections of cases, lead to better recognition of its value. * * After about eight years of careful study I am of the opinion that Electrotherapy has a definite application in urology. * * * It possesses one unquestionable advantage, which is that it does not add to the destructive process of the disease unless inexcusable blunders are made.

Further, without doubt, it creates a healthy circulatory condition deep in the affected part, probably both through a local tissue and peripheral nervous influence. Unless the average local application it does not cause exfoliation of epithelium and thus add to a process already existing, as in gonocaccal infection. In acute infections where the mucosa is so irritable that no instrument may be inserted only external forms as in X-ray, radiant light and Diathermy are possible.

* * * Where massage influence is called for, the positive pole of the static machine is in order, or the mild sinusoidal current combining faradism and galvanism. Where dilation is required, as in stenosis of the uterine os or in urethral stricture, the negative galvanic pole is very valuable. When stimulation and mild caustic action are sought for, then the galvanic pole is used cautiously.

For penetration of various medicaments—notably copper, zinc and iodine—ionization is the method. The copper and zinc must be attached to the positive pole and iodine to the negative pole. Too much caution can not be used with ionization until real skill is established.

Electrotherapy cannot be learned in a short time but it will reward all the time and energy employed both in learning and in applying it. With the caution and limitations indicated herein I recommend it highly.

□ □ □

"—and some of the so-called 'little' things are extremely far reaching in effect."

Here is an excerpt from one of the Chicago papers of recent date:

Tick of Bishop's Watch Spoils Radio Lecture

A radio audience of 1,000,000 persons in Milwaukee, Minneapolis, Detroit, Cleveland, Indianapolis and other points in a radius of 500 miles of Chicago, which tuned in Sunday night to listen to a lecture by Bishop Fraser McDowell at Orchestra Hall, yesterday began deluging the Sunday Evening Club with complaints that it couldn't hear the lecture because of the ticking of his watch!

It developed that the Bishop had placed his watch too close to the transmitter while telling how small the world is!!

Treatment of Menorrhagia by Radium

B. Blacker (Lancet, March 3, 1923) says the results obtained by those who have employed radium in the treatment of uterine hemorrhage show that it is a valuable and efficient method in controlling excessive hemorrhage at the menopause, and that it can be employed safely for the same purpose in small uncomplicated fibroid tumors of the uterus, also in excessive menorrhagia in young women, which resist ordinary methods of treatment, can be brought under control.

Quartz Light Treatment of Leukoderma

Toomey has secured improvements in two cases of leukoderma by means of ultra-violet radiation. Complete pigmentation of some of the areas was obtained. More or less pigmentation was developed in all of the areas, the degree of pigmentation in some areas effecting a very acceptable cosmetic improvement. The Quartz light pigmentation of the achromic areas has persisted for more than six months with no apparent loss of the acquired pigment. The leukodermic areas that responded with complete or nearly complete pigmentation as a result of the use of the quartz light were the bones situated on the face. Achromic areas on covered surfaces of the body responded to the light with only a partial degree of pigmentation, the degree of pigmentation in an area being approx.mately in inverse ratio with the degree to which it had been habitually kept protected from the sun's rays.

When You Are Discouraged Read This

When a very young man, Abraham Lincoln ran for Legislator in Illinois. He was badly beaten.

Abe then turned his steps toward the business field. Failed. Spent about 17 years of his life paying up the debts of a no-good partner.

He fell in love with a very beautiful woman, became engaged and she died.

He entered politics again, ran for Congress and once more was swamped.

He then tried to get an appointment with the United States Land Office. Here again he fell down.

He became candidate for the United States Senate, and still another time he was beaten.

In 1856 he wanted to be Vice-President of the United States. Once more he succumbed to defeat.

Just one failure after another, bad failures, set-backs of the most trying kind. But in spite of all this, in spite of every beating he ever had, and all the little glooms that hovered over him, he eventually became the most beloved and greatest man this country ever knew and his name will go down through history—to time immemorial.

□ □ □

GOSH!

Where can a man buy a cap for his knee
Or a key for a lock of his hair?
Or can his eyes be an academy
Because there are pupils there?
In the crown of his head what gems are found?
Who travels the bridge of his nose?
Does the calf of his leg become hungry at times
And devour the corn on his toes?
Can the crook on his elbow be sent to jail?
Where's the shade from the palm of his hand?
How does he sharpen his shoulder blades?
—I'm hanged if I understand!

A PAGE OF FUN



Madge—So Charlie is teaching you how they play baseball?

Marjorie—Yes, and when I asked him what a squeeze play was I think he put one over on me.

□ □ □

A little girl, visiting for the first time in the country, watched the farmer's wife plucking a hen. After a careful scrutiny of the tedious process, asked the young visitor: "Do you have to undress it every night?"

□ □ □

"You look fed up, old man."

"Yes, I've had a tiring day. That little beast of an office-boy of mine came to me with the old gag about getting off for his grandmother's funeral, so just to teach him a lesson I said I would accompany him."

"Ah, not so bad; was it a good game?"

"No, it was his grandmother's funeral!"

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"I'll be through in a minute," said the ice-cutter as he stepped onto the thin ice.

A lawyer earning about $3,000 a year was insured for $60,000. He was once reported dead, but it was a false alarm. He cabled to his partner: "I survived. Try and break it gently to my wife."

□ □ □

"No, I shall marry only a brave man," said the maiden firmly.

"But you must admit that it takes bravery for a poor mutt like me to propose to such a beautiful and talented girl," countered the suitor. So they lived happily, etc.

□ □ □

"When are you going to pay for that X-ray machine I sold you?"

Doctor Drill: "Pay for it? Why, you said that in a short time it would pay for itself!"

SOME MEN ARE CONTENT TO ENVY SUCCESS IN OTHERS; OTHERS ACHIEVE IT FOR THEMSELVES.

FISCHER'S MAGAZINE

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353

FEBRUARY, 1924

SUCCESS IS ONE PART
INSPIRATION
AND NINE PARTS
PERSPIRATION

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II FEBRUARY, 1924 No. 5

Physiotherapy

THE degree of success met with in the practice of physiotherapy depends upon the knowledge of themo dality used and the method of its application. Only study and experience can make the successful practitioner.

Neurotic patients are tremendously aided by physiotherapy. In neuropsychiatry the mere fact of treatment acts as a tonic and gives the patient courage to bear up until Nature gets a chance to do her work.

Fractures and dislocations are aided by the absorption of inflammatory products and the prevention of atrophy. Hastening of bony union and promotion of metabolic processes is brought about by physiotherapy and there is a more speedy restoration of function. Heliotherapy, diathermy, iodides, rest and proper food are advised. Many cases of adhesions yield readily to treatment.

In some cases of osteomylitis, copperization and ultraviolet rays with massage accomplish wonders. Tuberculosis of the bones will respond to ultraviolet treatment when all other means have failed. Ultraviolet in rickets need only be mentioned.

The different types of paralysis are more or less aided by physiotherapy. Only the most skilled operator can accomplish results here. Cerebral paralysis is the most difficult form to treat but even it is sometimes helped by rest,

massage and electrical stimulation. In spinal paralysis surgery is first called upon and physiotherapy used as an aid. Hemorrhage of the cord calls for the same treatment. Peripheral nerve paralysis can be aided to a greater degree than can any other form. In infantile paralysis the condition for regeneration is more favorable than in traumatic peripheral paralysis. Stretched muscles that have not functioned for many years but are not paralyzed may be restored by electrical stimulation.

Ulcers are much benefited by physiotherapy. In neuritis the cause must be removed by whatever means is necessary and physiotherapy then used. Sciatica, lumbago and all forms of myalgia yield readily to diathermy. Torticollis responds less readily. The progress of arthritis can sometimes be arrested though it cannot be cured. In neurocardio asthenia at least 60 per cent of patients are cured.

Dementia praecox is incurable but mental trouble of the praecox type clears up. Epilepsy *grand mal* cannot be cured but *petit mal* can be.

(*J. Indiana M. A. 335-338, October, 1923.*)

□ □ □

Dr. Homer Dupuy

(In the New Orleans Medical Journal)

Dr. H. W. E. Walther demonstrated the new Fischer hospital diathermy unit and lauded its value in the treatment of certain urological conditions. Diathermy, the latest and unquestionably the most useful of the high frequency modalities, is employed in two forms—medical and surgical—both being generated in the same way, but applied differently. In medical diathermy we raise the temperature of tissues only within physiological limits; in surgical diathermy we far exceed this limit; destroying tissue. d'Arsonval current is used. Dr. Walther stated that much benefit to his patient had been noted in applying medical diathermy to cases of arthritis,

prostatitis, seminal vesiculitis and epididymitis. The pain usually disappears after the first treatment and the swelling and period of confinement to bed are most favorably influenced. Applications require twenty minutes.

In surgical diathermy (electro-coagulation), where high frequency current is applied for the destruction of tissue by heat, without sparking, we have a modality for destroying new growths that is bloodless, clean, producing little shock, and which seals all lymph channels in its wake. For treating tumors of the bladder, cervix, urethra and external genitals, it surpasses scalpel-surgery.

Dr. Walther stated that he first became interested in surgical diathermy after a visit to Dr. Gustav Kolischer at Michael Reese Hospital, Chicago, where Kolischer has done commendable work with diathermy and radium in cancer of the bladder and of the prostate. It is today conceded by all that the only scientific way of handling malignant neoplasms of the bladder or prostate is through the open bladder. Some few selected vesical papilloma, of small size, can be successfully treated by diathermy and radium through the cystoscope. But the majority of bladder growths, extending from trigone into the internal vesical spincter, are best treated through the cystotomy wound. Kolischer lays stress upon the point that, in treating tumors of the lower urinary tract by means of diathermy, one requires an apparatus that will deliver up to 4000 M. A. current. This can only be obtained in the newer type of machines.

The results obtained with diathermy in the Urological Service of the Hotel Dieu will be reported in detail later in a special article on the subject. Dr. Walther acknowledged indebtedness to his associate, Dr. C. L. Peacock, for his valuable assistance in this work.

Dr. Dimitry: Dr. Walther's demonstration carries a message of assistance to those who handle malignant cases, for by his Diathermy demonstration he enlightens us on a

procedure that may prove valuable in preventing metastasis i. e., if malignancy is accepted as a local and not a general condition. Surgery cares for the offending condition, but by removal it adds the possible danger of dissemination. The Deep X-ray is stated to be beneficial if administered a short while before operation for it is said to constrict surrounding lymphatics and vessels.

I have often desired, in my special line, to add still further precaution by the use of the hot iron, and I had hoped to have used this diathermy procedure, but lacked a working knowledge until this night, when the doctor has so well explained its use.

I would ask further enlightment of its use when the eye is to be removed for a malignancy. After the use of the diathermy needle, should we wait for a slough before proceeding with the knife and scissors to remove the eye?

Dr. Walther: It is best to wait several days to a week for each slough to come away before attempting removal of tumor mass.

□ □ □

Enlarged Gland

From a California Contributor

Case C. M. came to my office with an enlarged gland, about the size of a hen's egg, with history of over exercised shankroid of about two weeks' duration, which had previously healed.

Treatment consisted of exposure to the rays of a Deep Therapy Lamp 30 minutes at a distance of 30 inches eight times. The gland was reduced to the size of a bean, and subsequently reduced to normal size with no further treatments. No recurrence of shankroid after two weeks, and then the patient was discharged.

Out of twenty-five cases treated by this method, only two went on to suturation.

Diathermy for Malignant Disease of the Mouth, Pharynx, and Nose

On the basis of the results observed in seventeen cases, Norman Patterson (*British Medical Journal*, July 14, 1923) asserts that in cancerous growths in the larynx and mouth the ultimate results are likely to be infinitely better when the primary growth is dealt with by diathermy, rather than by a cutting operation. Complete block dissection of the glands in the anterior and posterior triangles should be carried out even when these glands are not palpable. It is generally advisable to destroy the growth in the first instance and to remove the glands subsequently. Occasionally the two operations can be carried out at the same sitting. If there is any doubt as to the ability of a thorough clearance of the neck, then the gland operation should precede that on the primary growth.

If the glands cannot be dealt with it is little use applying diathermy to the primary tumor, except as a palliative measure. It is sometimes advisable to operate on the glands in the first instance, and to deal subsequently with the primary tumor, as consent for the neck operation may be difficult to obtain after the growth itself has been destroyed. Before commencing treatment, it is well to try and obtain consent for two or three operations, and to impress upon the patient the importance of the removal of the glands. If the diathermized area approaches or invades the fascial planes of the neck, a clear interval of a fortnight or three weeks should be allowed between the destruction of the primary growth and the neck operation.

□ □ □

Cataract

By way of response to an inquiry from one of our readers, Dr. B. B. Grover offers the following opinion regarding possible results obtainable by Physiotherapeutic means in the treatment of cataract:

"As far as my experience and the knowledge of the experience of others go, there is little to be said that is new in the treatment of cataract. However, here and there much good has been accomplished in recent cases by Diathermy, followed by the application of the constant current.

"It is well known that bone is the last tissue to become heated by Diathermy, and when heated will hold the heat for hours; therefore it is logical to heat the surrounding wall of bone, which will slowly give up its heat to the adjacent tissues and maintain hyperemia for a considerable period of time. This may be accomplished by passing the current from temple to temple as well as its application by means of a non-vacuum high frequency electrode over the closed lids.

"This method should be alternated with 2 to 5 milliamperes of the constant current. The treatment should be continued for many weeks. These cases are usually accompanied with hypertension which should be corrected in order that the best of results may be obtained.

—Burton Baker Grover, M. D.

□ □ □

Diathermy in Gonorrhea in the Male

Serés is convinced that nothing is so effectual as diathermy in dislodging gonococci lurking in the tissues around the urethra, which may maintain the infection for years. His rectal electrode opens like a fan in the rectum, and thus acts on a large area, including the prostate and seminal vesicles. Even at the best, this treatment is not always successful, as some gonococci escape in the deeper tissues. But gonococcal epididymitis and gonococcal urethritis in women can always be cured with diathermy as the anatomic conditions allow a perfect electric bake. When technic is perfected to allow this throughout, gonorrhea will be conquered; it is merely a question of enough electrodes. With recent infection, the gonorrhea is cured in two or three sittings, but acute urethritis in the male once established has generally proved refractory. Only when it has subsided under the usual local measures, does diathermy help to eradicate the infection. With more and larger electrodes he is confident that every acute urethritis can be conquered.

(abs. J. A. M. A.)

Endothermy

A Case Report of George A. Wyeth, M. D., of New York

CASE I. J. W., age 66, sailor, referred by Dr. W. B. Moodie of Valhalla, New York, reported that about 2 months previously a pimple had appeared under his tongue. He thought that the dental plate was irritating his mouth, but was assured by his dentist that this was not the case. He paid scant attention to the matter thereafter, but while he was at sea the pimple began to grow. On returning to New York he went to a hospital where "the doctor opened it and since then it has had a hole in it."



Before Treatment



After Treatment

Examination showed an indurated mass, about 3 centimeters by 2 centimeters in size, involving the right side of the floor of the mouth. It was foul and had a crater-like ulceration at right of the frenum. It was painful and tender, but no palpable, cervical glandular enlargement could be made out. On June 2, 1921, under ether narcosis the entire mass was completely surrounded or isolated by bipolar endothermy. To establish this definite wall of coagulation necrosis around the malignant area, it was necessary in this case to coagulate through the frenum, the under surface of tongue, and the inner surface of right jaw. A section for the microscope was then removed with impunity after which the whole mass was coagulated *in situ*. The dead tissue was next removed by scissors and the entire cavity seared over with the current to produce a further penetration of the heat. The lingual artery was not ligated.

Patient returned to room in good condition. Next day there was considerable swelling of tongue and a profuse flow of saliva, but he was free from pain and was able to take liquid nourish-

(Cont'd on page 10)

"Lobar Pneumonia is One of the Scourges of the Human Race

"LIKE Typhoid Fever it attacks the rugged as well as the weak. Unlike many diseases in which acquired immunity is developed, one attack is apt to increase the liability to subsequent seizures."

". . . Through permission received from Senior Surgeon George B. Young, then Medical Officer in Charge of U. S. Marine Hospital No. 21, N. Y., and with the co-operation of Dr. Bryan who was chief of the Medical Service, this work was undertaken by the author's department at that Hospital. It was agreed that when accepted means of treatment had proven unavailing, Diathermy should be tried in the first case in which there was otherwise apparently no hope of recovery.

"In January, 1922, such a case occurred and the treatment by direct Diathermy was started. The result in this first case was one of the most dramatic in the author's medical experience. The relief the patient received from severe pleuritic pain and dyspnea was immediate. His cyanosis disappeared in about seven minutes after the treatment was begun. The temperature began to fall immediately by lysis. He received from 2 to 4 hours of complete relief after this, and each succeeding treatment, and made an uninterrupted recovery.

"Now Diathermy has been ordered as soon as the diagnosis is made in every case of Pneumonia at the Marine Hospital. It is not too much to assume that in many critical cases this marked relief of symptoms may be the turning point in disease."

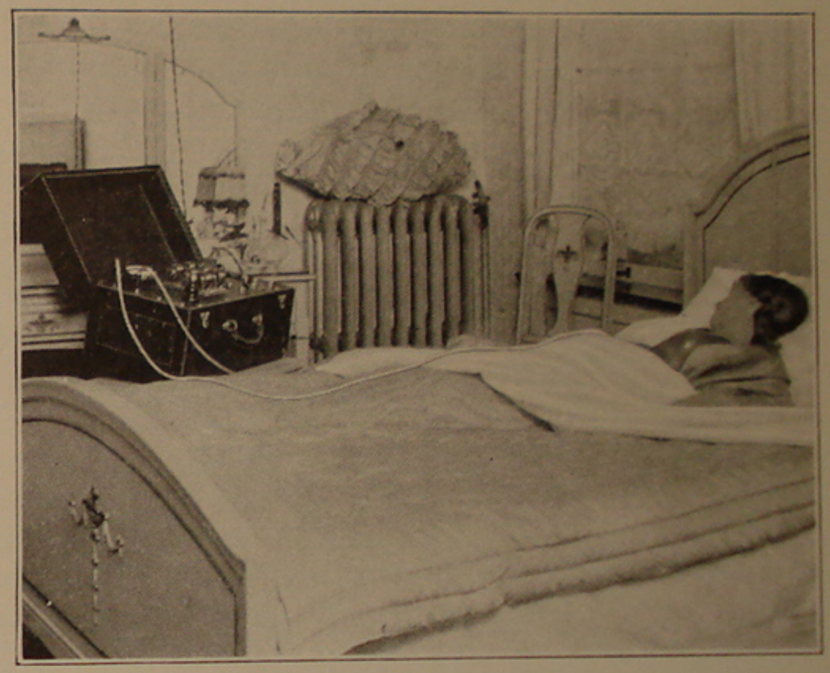
—From Dr. Harry Eaton Stewart's "Diathermy in Pneumonia"

The Treatment of Pneumonia

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ment. He left the hospital on the third day in fairly good condition, although toxic absorption had rendered him very cachectic in appearance, with skin of a dark, yellowish hue, both of which conditions cleared up rapidly.

Sloughing of the remaining necrotic tissues began shortly afterward and was complete in the third week, although a piece of bone sequestrated from the inner surface of the jaw in the sixth week. Wound healed completely, and patient has remained free from pain. There was early return to normal diet and a gain of 15 pounds in weight within 3 months. Both sides of patient's neck were treated with deep penetrating X-ray as a postoperative prophylactic measure.

If we consider the technique of the treatment, we shall understand the particular advantages of endothermy. The first step in the procedure is to describe in the healthy tissue a protective ring of destruction around the malignant area. That is, before a malignant area is touched it is completely surrounded by a wall of coagulation necrosis, which shuts off and destroys the blood vessels and lymphatics to and from the affected part. After this the entire lesion is destroyed and removed. Just how much current shall be used and for how long, the operator must learn by experience. Dosage is, however, always under accurate control and conservatism demands that one overtreat rather than undertreat, for a stimulating dose is worse than no dose at all.

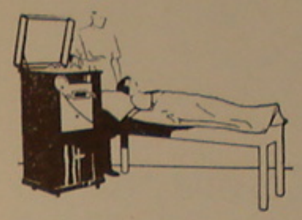
It is not difficult to understand that this line of destruction drawn about the malignant area to cut off blood vessels and lymphatics cuts off, also, the sensory nerves, and as the malignancy is removed the pain is alleviated. The value of the sterilizing effect of the heat upon a foul, discharging area is appreciated by the patient, for it renders his wound less offensive. One can scarcely overestimate the importance of these features of the method, particularly in the treatment of lesions in and about the mouth. In such cases, the small remaining slough comes away in from 2 to 3 weeks, and the area is completely healed within a few days thereafter. Patient can thus enjoy that early return to normal diet which is of the highest importance, since most of these cases are markedly cachectic, anaemic, and badly run down. Their chief postoperative need is nourishment.

(*From the New York Medical Journal*)

Albert C. Geyser, M. D.,

of Huntington, L. I.

in writing in the "American Physician" states in part,



"Diathermia is another measure which, acting in conjunction with the other two agents (the therapeutic bath and intravenous medication), is almost a specific in producing localized results in the chronic stage of disease.

"Diathermia, when applied to a joint or tissue, heats the same through and through. The local temperature of a joint or organ may be raised several degrees above the normal. When a given tissue is so heated there ensues an active arterial hyperemia.

"The capillaries become dilated, and increased leucocytosis with consequent diapedesis is a physiological result. While the effect is primarily of a local character, the general result is a far-reaching constitutional therapeutic measure. Such capillary dilatation increases the local effect of the intravenous medication, especially that of sodium iodide.

"When these three measures are employed at the same time, each one makes the other more effective; the bath and diathermia call for physiological functions, while the sodium iodide removes that which interferes with organic functions.

"After a short course of this treatment, the 'Chronic' is in a physiological condition for such specific treatment as his case may demand.

"The *anemic* requires the *intravenous use of iron and arsenic*, the *syphilitic*, *mercury* or *some form of arsenic*, the *paralytic* (peripheral) *diathermia* to the spinal segment and nerves involved. When it is of central origin the continuation of the iodides; for the pain sod. salicylate, etc., etc. Every therapeutic measure in chronic ailments especially, must aim to restore lost or perverted function according to

and in harmony with the laws of physiology. This concept seems to be understood by few, misunderstood by many and underestimated by almost everybody. *It is not the agent, but the specific reaction on the part of living cells that must be our constant aim in applied therapeutics.*"

□ □ □

Electricity as a Diagnostic and Therapeutic Aid in Medicine

By ROBERT P. STURR, M. D., Philadelphia

Extract from American Physician, May, 1923

No field in medicine offers more encouragement for study and application than does electricity. Having risen from the ages of a mystic healing device, and having passed through the hands of every charlatan and "pathy" that has existed and cast itself upon the gullible public, electro-therapy has survived and established itself into modern medicine as one of its firmest foundations.

We are teaching it in our medical schools; every large hospital has its department of electrotherapy, and many large industrial organizations and rehabilitation clinics are adding this to their hospitalization departments. Our Veterans' Bureaus have this department as one of their chief aids in the restoration of the wounded soldier to his former state of health. The war played a great part in bringing physiotherapy to the front. The percentage of permanent disabilities would have been alarming had not this science been utilized in the after treatment of wounds and fractures. * * * .

The physician who specializes in electrotherapy should be able to make application and have apparatus for the following currents: Static, Galvanic, Faradic, Sinusoidal, High Frequency and Ultra-violet * * * .

The High Frequency current is one of high voltage which is interrupted thousands of times a second, making its voltage practically harmless. From this current we get * * * Electro-coagulation. This method has won its way by merits alone. No physician can help but marvel at the results obtained by Electro-coagulation especially in the destruction and diminution in size of benign and malignant growths.

This is not a Cautery as many think, but a coagulation of the tissue and a rupture of the cellular walls. To show that this is not a Cautery, we can pass the current through paper to tissue beneath and not burn the paper, yet coagulate the tissue. * * * Any part of the body will stand the application of this current, from a growth on the cornea to a massive tumor of the breast, or a tumor within the body such as the bladder.

This method has taken a gigantic place in surgical realms. Daily we are called upon to use this method as an aid to the surgeon.

THE TECHNIC

All parts are cleansed as in a surgical operation, and all precautions of asepsis are taken. Either local or general anesthesia may be used. The tumor mass is encircled, taking in some normal tissue, and then divided into areas and all parts destroyed, curetted and destroyed again, until sound and normal tissue is found.

Bleeding is controlled automatically by the application of the needle to the part, as it seals up the blood vessels. The part is left with a dry black coagulated surface, which remains so in most cases for a week; then this becomes moist and a slough forms with much exudate, which in the average case heals within two or three weeks by granulation, and the average final result is very little scar formation which is very pliable and non-contracting. In the majority of cases, this work is done at one operation, but where the area is too large or some has been left, it is perfectly correct

to repeat the procedure several times. But in malignancy it is best to destroy all affected tissue at once, as too little often acts as a stimulation to any remaining tumor cells.

PRECAUTIONS

How far one should go is a matter of great importance, as the current effect is beyond vision and extends down into the tissue; thus great caution must be used when working around the eye, etc., or in cartilage. I recall a case we did several years ago of a wart on a colored man's ear; we coagulated and removed the wart, but we also removed a nice round area of cartilage under the wart and left a perfect hole, which was an early lesson. Also, when working near a blood vessel, if one go too far the slough might involve it, and secondary hemorrhages result.

When ether is being given, it should always be taken away from the mouth as an explosion may result, but the ether in a patient's breath does not matter even when working in the throat. Secondary hemorrhage is apt to occur when the slough is interfered with or it is torn away too soon, or a blood vessel damaged.

ADVANTAGES OF THIS METHOD

The advantages of this method are many. There is little danger of infection, as the lymph spaces and blood vessels are sealed up, and the high heat kills all organisms. Each blood vessel is sealed while working. There is less danger of metastasis, as blood and lymph channels are sealed. Very little shock is present, as no blood is lost and the patient is not under ether long. Scar tissue, formed as a result of this treatment, does not contract, and therefore we can work around the eyelids without danger of entropion or ectropion following, or we may treat the flexor joint surfaces with no fear of the after-contraction which is usual in surgically treated cases. One hundred per cent cure is gotten from epithelioma of the face above the lower lip.

Those cancers of the prickle-cell type should be followed by radium and X-ray to the glands, and over the coagulated areas.

At the Polyclinic Hospital we are following each electro-coagulation with a two-third erythema dose of X-ray, heavily filtered—no matter what the type of malignancy.

* * * . □ □ □

Diathermy in Surgery

Bianchini extols the advantages of diathermy in certain surgical cases, the absence of hemorrhage, the brief time required for the electro coagulation, in comparison with operative measures, and the ease with which the procedure can be repeated in inoperable cases. The drawbacks are the danger of secondary hemorrhage as the eschar drops off, and the danger of injury of bone, with sequestrum formation. A complete cure was realized in nearly all the twenty cases of tumors, angiomas, keloids or adenoids he describes, but he emphasizes that diathermy is merely an aid to surgery, and cannot take its place.

□ □ □

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A PAGE OF FUN



"Ma, can I go out to play?"
"What, Willie? With those holes in your trousers?"
"Naw, with the kids across the street."

□ □ □

Teacher: "What is the shape of the earth"?
Willie: "Pop says it's in a helluva shape."

□ □ □

A class of boys had been studying physiology, and one day the teacher told them to write a composition on "The Spine."
Among the many papers sent in was the following:
"The spine is a bunch of bones that runs up and down the back and holds the ribs. The skull sits on one end, and I sit on the other."

□ □ □

"Do you play Mah Jongg?"
"No. I haven't touched a piano in years."

Doctor: "You have appendicitis. I must operate."
She: "Oh, Doctor, will the scar show?"
Doctor: "Well, it shouldn't."

□ □ □

Candid Hostess: "My dear, I should never have known you, from your photographs. Reggie told me you were so pretty."
Genevieve: "No, I'm not pretty, so I have to be nice, and it's such a bore. Did you ever try it?"

□ □ □

"The boss offered me an interest in the business today."
"He did?"
"Yes. He said that if I didn't take an interest pretty soon he'd fire me."

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FISCHER'S MAGAZINE



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354

MARCH, 1924

THE MAN WHO KILLS TIME GENERALLY FINDS HIMSELF CHIEF MOURNER AT THE FUNERAL.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II MARCH, 1924 No. 6

SERVICE

To Others

A certain magnate was once asked to what he most attributed his success. He replied "TO OTHERS." Ponder that—it contains deep philosophy. This was long years ago that he noted "To serve is to successfully survive."

"Quality"—An Expression of Service

"TO OTHERS" and "SERVICE" have long been established laws and watch-words throughout the FISCHER organization and have readily found expression through quality and satisfaction of FISCHER equipment universally recognized to be the world's finest product.

Fischer's Magazine

It is your magazine—devoted to your interest and welfare. It is your convention hall—a common meeting ground where all can look for good and wise counsel, discuss subjects of mutual interest and exchange ever welcome ideas. If you have an idea—an instructive talk—send it in, maybe your neighbor can use it. Be of service to him.

The Treatment of Chronic Prostatitis by Electro-Therapy

W. B. CHAPMAN, M. D.
Carthage, Missouri

In the treatment of chronic inflammatory conditions of the prostate, certain factors must be taken into consideration, which, when properly considered, explain the futility of the time-honored methods employed by physicians in the treatment of such cases. It is a well-known fact, that sufferers from chronic prostatitis, usually drifted from one physician to another, then to the chiropractor or divine healer, finally becoming wholly discouraged and giving up to a life of semi-invalidism and patent medicines.

Chronic prostatitis is almost invariably the end-result of a gonorrheal infection. And in the majority of cases, is induced by the injudicious injecting of various remedies by the patient or by unwise instrumentation on the part of the attending physician.

The prostate gland almost encircles the deep urethra at the outlet of the bladder. It contains some thirty or more branched tubulo-alveolar glands, embedded in a mass of muscular tissues. These glands open through their ducts directly into the urethra.

On the introduction of infection into these glands, there is the usual acute inflammatory reaction, which is followed in the chronic stage by the formation of fibrous (scar) tissue. This may cause obliteration or obstruction of the gland ducts, thereby preventing the escape of bacteria and cellular debris, which lie bottled up and may cause trouble for many years. The physician has treated this condition by prostatic massage and deep urethral injections of weak solutions of silver salts with somewhat unsatisfactory results, and, urologists in general, while accepting this form of treatment as standard, frankly admit that few cases of chronic prostatitis leave their offices cured. The mechanical emptying of such glands, as have remained patent, by the prostatic massage is to be commended, but many prominent urologists have long maintained that the injection of antiseptics into the deep urethra merely irritates the urethral mucosa and tends to form more scar tissue, thereby doing more harm than good. These tubulo-alveolar glands are so formed that they effectually prevent the introduction of fluids from without inward, and it is highly improbable that even the minutest quantity of the antiseptic injected finds its way into the glands. I feel that we can discard the deep urethral injection as a procedure that is not only useless but harmful to the patient.

Now taking for granted that the accepted deep urethral injection is of no benefit, what other procedure can we resort to for the treatment of this condition? We know that massage alone will not cure the condition. We likewise know that medicines taken by mouth or hypodermically cannot reach the gland in sufficient concentration to be of much benefit, we must, therefore, search for some agent that will set up a healthy reaction within the gland, and that will not produce injury to adjacent organs and tissues. Fortunately, we now have such an agent in what is commonly termed diathermy. This merely means the application of currents of electricity of low tension and high amperage which produce heat within the deeper parts of the body.

It has been found that gonococci cease to multiply and cannot long exist when subjected to a temperature of 104 degrees Fahrenheit. Sampson claims that it is possible to produce a temperature within the tissues by the use of diathermia to as high as 138 degrees Fahr., without injury to the tissues. This being correct, one can easily see how effective this modality will be in the treatment of an old gonorrheal infection of the prostate. Furthermore, the application of heat within the gland causes a marked hyperemia, with increased vascularity and consequent increased activity of the secretory glands; the increased blood

supply aiding in the absorption of waste products and the secretory glands mechanically washing out accumulated concretions and cellular debris. There is also an attraction of leucocytes to the part with consequent destruction of bacteria. In other words, we simply induce within the old, stagnant, prostate, a healthy reaction which is identical with nature's method of combating infection. We have all of the factors found in a healthy inflammatory reaction except the pain, and diathermia is painless. Neither are we introducing some foreign substance, usually a poisonous mineral salt, into the system, which must be absorbed by the system with more or less damage to all vital organs.

As the prostate gland is easily accessible through the rectum, we have no difficulty in applying one electrode in contact with the gland. For this purpose the prostatic electrode designed and sold by H. G. Fischer & Company of Chicago, is the best. It is hollowed out on one side, can be easily introduced into the rectum, and, when in place, fits snugly over the prostate. The larger, indifferent, electrode should be placed on the abdomen so that its lower edge is about one inch above the symphysis pubis and at least that far from the hip bones. I have found that whenever possible the current will follow the bones in preference to the softer tissues. For this electrode, either wire mesh or block tin should be used. It should be about five inches in diameter and should be well soaped and in perfect contact with the skin. In introducing the prostatic electrode, I find a coating of glycerine quite effective.

While any standard High Frequency apparatus will prove effective for this work, I have been able to obtain the best results with the H. G. Fischer cabinet type of machine. I have used other machines, but with mediocre success. To be successful in this work, it is imperative that one uses a machine which has a capacity of at least three thousand milliamperes. While I never employ more than half that amount in treating, still I get better results with the larger machines than I obtain with the smaller types that must be pushed to capacity.

I have one of the smaller machines, but seldom employ it for diathermia treatments. There seems to be a difference in the rapidity of the oscillations, which probably explains the better results obtained by using the higher type machines.

While I have discussed the good effects produced by the internal heat, I have failed to mention another reaction which I consider of far more importance than the mere production of an internal hyperemia in the diseased area. With the rapid transmission of these electrical charges, there is set up within the tissues a certain amount of chemical action. We have all watched the experiment in the physical laboratory wherein electricity was allowed to flow through a U-tube containing water and saw the liquid transformed into its component gases, oxygen and hydrogen. We have likewise studied the reactions taking place in the wet cell batteries, and later on have seen how complex molecules may be broken up by electricity into simpler compounds or even into the elements. That such a reaction occurs during the transmission of the current through the tissues of the body is quite apparent. We mentioned above that the prostate lies at the outlet of the bladder. As is well known, with inflammatory conditions of the prostate there is more or less obstruction to the out-flow from the bladder with a consequent accumulation of salts and complex protein products along the walls and lower portions of the bladder. This is especially true in old men who have hypertrophied prostates with retention of urine. In the chronic prostate there are also crystals and an accumulation of protein substances, mainly cellular debris, which are affected by the passage of the current. That these substances are broken up into simpler compounds that are more readily absorbed by the blood stream can be demonstrated by the rapid decrease in shreds, etc., in the urine following a few of these treatments.

Another factor. We are also aware that most chemical reactions proceed only in a liquid medium, usually water. We have here the ideal location for chemical reaction, with the prostate and one electrode at the base of the bladder and

the other above; and in giving these treatments, I prefer to have the bladder partially filled as I depend on this chemical exchange of ions to aid as materially in the treatment as the mere production of heat within the gland. What changes of temperature take place within the bladder, I will not state here, but that there are changes, one can readily see. At the end of the treatment, I massage the gland to expel cellular debris and then have the patient void, thereby thoroughly cleansing the urethra, and expelling all foreign material discharged from the gland or stirred up in the bladder by the passage of the current. It would appear that to produce this effect, the galvanic current would prove the most effective, but clinically, I have failed to get better results where it was employed. Where there is retention of urine, I usually alternate treatments with the Morse Wave Generator, placing the electrodes exactly as I do for diathermia, except that I use the regulation Morse pad over the abdomen, giving ten milliamperes for ten minutes with the idea that I ionize the urine within the bladder and break up the complex salts that so quickly accumulate in a condition of this kind. I believe the treatment to be justifiable.

In giving the diathermia treatments, I advance the current slowly to about 1,200 milliamperes, allow it to run for twenty minutes and then turn it off gradually, I then massage the prostate, as mentioned above, and have the patient evacuate the bladder. The presence of material in the urine will act as a check on the progress of the patient. The shreds and cellular debris are usually excessive at first, but clear up as the treatments proceed. I give the treatments every other day in mild cases, and daily, where there is retention of urine in the bladder, washing out the bladder with a weak boric acid solution after the treatments if the patient's condition demands it. I have treated a number of cases of prostatitis by this method, and have yet to treat one that was not rapidly and materially benefitted. I consider this method a distinct advance over the older methods, and believe that it will soon supplant all other procedures.

Treatment of Gonococcal Infection by Diathermy.

—The reason for the selection of diathermy for the treatment of gonococcal infections by E. P. Cumberbach and C. A. Robinson (*British Medical Journal*, July 14, 1923) is because the gonococcus can be destroyed at a temperature which is not high enough to damage the living tissues and because the diathermy raises the temperature of the tissues *en masse*, whereas other methods of applying heat raise the temperature of the superficial parts only. In almost all of the cases of gonococcal arthritis treated the pain was abolished, the swelling was reduced, and the range of motion was increased within a comparatively short period of time. Cases of gonococcal orchitis and epididymitis without exception quickly were relieved of pain and swelling after diathermy, even if the symptoms were severe. Convincing proof of the therapeutic power of diathermy in gonococcal infection was furnished by the disappearance of pain and swelling from joints or scrotum after the application of the treatment to the site of the original infection. Cases of gonococcal arthritis were freed from pain after application of diathermy to the urethra and prostate, or urethra and cervix, without the inclusion of the joints in the treatment. There were also cases in which the application of diathermy to the joints did not procure much relief until the parts originally infected were included in the treatment. Diathermy was also applied to the urethra and cervix uteri in the female in cases in which these parts alone were infected. Such applications were followed by disappearance of the gonococci and cessation or diminution of the discharge. The effectiveness of the treatment was demonstrated by the failure to find gonococci in repeated attempts and the subsidence of arthritis after the application of diathermy, not to the joints but to the parts originally infected. Good results were also obtained in the treatment of prostatitis.

□ □ □

A *gentleman* has never heard a story before.

□ □ □

That Monthly Physiotherapeutic Meeting!

We know that you will be very glad to hear that we have arranged to have with us on Monday, April 14th

HARRY THOMETZ, M. D., of Chicago, who will perform a Tonsil Operation with Electrocoagulation, and also to give a report on similar cases——————
10 to 11 A. M.

RAYMOND F. ELMER, M. D., of Chicago, who has successfully operated on over 125 cases of Tonsils with Electrocoagulation, and who will demonstrate the correct technic——————11 to 12 Noon.

K. T. LAWLESS, M. D., also of Chicago, promises to give a talk on PHYSIOTHERAPEUTIC METHODS AS PRACTISED IN EUROPE, and we hope to have him on the floor at 1:00 P. M.

C. H. FREDERICKSON, M. D., who is connected with the Veterans' Bureau, at Chicago, will be with us from 3 to 4 P. M., and, although he does not tell us specifically just what his subject will be, he is such an experienced Electrotherapeutist that his hour will pass all too quickly.

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BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

Treatment of Myocardial Insufficiency

WILLIAM MARTIN, M. D.
Atlantic City, N. J.
Formerly Pres. Amer. Electrother. Assoc.



It has been the custom for generations to use "heart tonics" when a patient applies to the physician for treatment of "weak heart," which method still holds with the majority. The physician will feel the pulse and sometimes auscult the heart as he feels necessary and as a rule this completes the physical examination. Being expert in this type of case, he feels it unnecessary to do more, so the usual prescription of digitalis or strophantus is given and the case told to return at a suitable time for another prescription.

Recent years have brought the study of the heart and circulation as a necessity in practically all types of cases, since we have such constant evidences of some derangement of a part or all in many chronic diseases. Perhaps Mackenzie has done most toward establishing the weak heart muscle as a factor in so many disturbances of a vital nature, particularly in angina pectoris. A myocardial inefficiency from whatever cause, whether overstrain or toxemias, is recognized to be a menace to longevity, and may be a distinct menace to life itself under stress.

Given a circulatory stasis from a hepatic engorgement or other venous blocking, we will have stress against the right side of the heart, which will show itself as a simple strain with moderate symptoms, but as this increases later we will find an actue dilation develop with its dangers. Take the circulatory stress such as accompanies an active hypertension from any cause, functional or organic, we will find the ventricular walls endangered, but as they seem to have greater compensatory powers, the hypertrophy will be the first effect, but as this stress continues, we will have the evidences of failing compensation and loss of muscle strength.

What can we do for such cases? Shall we use the time honored doses of the heart tonics which must be given in increasing doses with their dangerous accumulative effects, or shall we use the more modern methods which some of us have learned to depend upon? In a practice covering thirty-five years the writer used the former methods during two-thirds of that time, but the remaining third with its more modern therapy has demonstrated the greater value of electrotherapy in these as well as other cases, and it is the modern method that he now wishes to place before the reader.

Granting the cause to be known and as much as possible having been done to eliminate it, we may proceed to treat the actual condition. If back of the myocardial weakness there is a hepatic engorgement, we must remove that by the use of diathermy as has been frequently mentioned in these pages. This will be the first step, which may be followed by diathermy of the heart. This must be done in a safe and sane way, so a more detailed statement will be given. We use two metal electrodes of the usual type approximately 4x5 inches, and when properly wet, they should be applied exactly opposite each other, the one directly over the heart and the other directly back, *not* allowing the current to flow in an oblique direction, but straight through. This is exceedingly important. Taking for granted that you have the proper machine with a good spark gap, the current is turned on with the minimum of current charge. The amount is slowly increased until in about five minutes you have reached the maximum, which should not be more than 300 to 500 ma. in the average case, and in some even lower. This is continued for from fifteen to twenty minutes altogether, counting the slowing up for the completion of the treatment. The ending may be done in about the same manner, although some take less time for this. Playing safe is the best method, so as the treatment is going on, the physician will note any effects upon the circulation and general condition of the patient, so that the treatment can be cut off at a minute's notice, if necessary. As the treat-

ments are given from time to time, somewhat larger doses may be given under the same watchful care, and in time the response will be noticed in a general betterment of the patient.

Vibration of the interspaces of the 7th cervical and 1st dorsal will add to the value of the diathermy, and this may be given for from 1 minute to 1½ minutes, following the other, as its effects upon the heart centre has great value, and the writer always uses it in this manner. The treatment just outlined will usually suffice, if persisted in, and the writer trusts that it may help others as much as it has him in the therapy of these cases.

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Diathermy of Facial Paralysis.—Bordier recommends diathermy in facial paralysis, especially in cases with a slight reaction of degeneration.

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In response to an inquiry on the value of Diathermy in connection with fractures, we received the following short but clean-cut article, for which we are very grateful:

In diathermy on fractures, we permit knitting to take place in the normal way, without disturbance for a week or two, until the dressings can be handled without displacing the fragments. There is no rule about this; each case must be judged individually. Then we remove the dressings daily and apply diathermy. Lots of work; but results are worth it. Do not mount electrodes in casts; that is dangerous; ischemia may result from the swelling that the diathermy produces; and there is no way of checking burns. If a plaster cast cannot be made removable, we omit the diathermy.

Cordially,

Miles J. Breuer, M. D.
Lincoln, Neb.

Diathermy in High Blood Pressure and Other Conditions.
F. Howard Humphris, F. R. C. P., Brit. M. J.

Patients with high arterial tension may be treated by diathermy and kept in a state of safety thereby. If the hyperpiesia be recognized early, diathermic treatment will prevent an otherwise inevitable consequence. Even though arterio-sclerosis has become established the process may be stayed and the very serious sequelae avoided.

The effects are two-fold—one is general or constitutional, affecting metabolism, and the other is a local effect upon the vasomotor system. Clinically there ensues a general improvement in the health and the mental outlook, while chemically there results an increase of solids in the urine and in the perspiration. All these effects are perhaps due to the relaxation of the arteries and the better circulation resulting therefrom.

The use of medical diathermy in pneumonia has been proved of value and attention is called to this work in the United States Marine Hospital, which the author says has the best medical service of any country he has visited.

He also believes that medical diathermy is destined to play an important role in the treatment of pulmonary tuberculosis.

In the discussion of this paper Dr. Turrell said that the mode of action of diathermy and how it might apply to the case in hand should always be considered in arriving at a decision as to treatment; for example, in a case of spasmodic dysmenorrhea would relaxation of the spasm relieve the patient and would diathermy accomplish this? In an unresolved pneumonia would an increased blood supply help and would diathermy bring this about? He added that diathermy had been found of great benefit in non-surgical hemorrhoids, in dysmenorrhea and in coccygodynia of the simple congested type. It is useful, he said, for high blood pressure, but a hot bath is of equal value and is more simple

treatment whenever possible. It is useful in rheumatoid arthritis, but must be long continued. All discussants agreed upon its usefulness in relief of gonococcis infections.

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Stricture of the Urethra

BURTON B. GROVER, M. D.

Vacuum tube currents may be of service in removing spasmodic stricture, but I doubt very much their being of service in the organic form. Strictures resulting from gonorrhea may be removed by electrolysis. I have cured over 100 cases by this method.

Technic—First ascertain the size, the location of the stricture, then place a well-soaked pad on the abdomen and connect to the positive pole of a direct continuous current. Connect the negative pole to an olive-shaped urethral electrode, one size larger than the lumen of the stricture; pass the electrode down to the stricture and turn on the current gradually up to from 3 to 5 milliamperes; keep the electrode in contact with the stricture by gentle pressure until it passes, then withdraw the electrode through the stricture and turn off the current gradually to zero before removing the electrode from the urethra. Repeat the treatment every seven days, each time using a larger electrode until the normal calibre of the urethra is restored. There are a few old strictures that will not yield to this treatment. Strictures that have been operated upon are very rebellious and often incurable. For these cases the Neiswanger technic, 1% solution of thiosinamine cataphorically, is often successful.

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In King Tut's tomb was found a tablet giving a recipe for the Elixer of Youth.

Hooray!! The recipe is *honey and wax, mixed with fourteen vegetables*. The vegetables, however, are not named in the inscription on the tablet.

Gall Bladder Infection

At the recent annual meeting of the Iowa Radiolological and Physiotherapy Society at Des Moines, Dr. A. B. Adams of Omaha, Nebraska, read a paper on "The Value of Sine Wave Current in Obstruction of the Hepatic Duct".

He reported a case which has passed through the usual operative procedure for drainage without satisfactory result —yet the Morse Wave Generator, by its selective surging action accomplished all that was desired.

Dr. B. B. Grover, of Colorado Springs, Colorado, in the February number of the "Bulletin of The New England Society of Physical Therapeutics" reports several cases successfully treated by the Sine Wave.

The infected Gall Bladder evidently loses its muscular tone necessary to expel into the duodenum its putrifactive contents, and just a little non-irritating mechanical help applied to this regien with the Gall Bladder Nerve Area in the circuit, is apparantly the one thing needed.

Treatment of Gonorrheal Affection by Diathermy.

C. A. Robinson, M. B., D. M. R. E., Brit. M. J.

The gonococcus is less resistant to rises of temperature when in culture than are most pathogenic organisms, though the temperature most suited to its growth in living tissues is not known. Whether the destruction of the germs by diathermy is due to direct or indirect effects of the current the author does not know, but he is sure of the results in gonorrheal infections of the joints, namely, that such cases are amenable to treatment by diathermy. The optimum temperature to secure these effects by diathermy is about 115 degrees F. Results in cervicitis prostatitis, epididymitis, etc., have been very gratifying.

A PAGE OF FUN



There were two negro buck privates discussing the relative values of their buglers during the recent war. You know, negroes are naturally musical, and they can certainly do great things with a bugle.

The first private stated, "Why, nigger, that bugler of mine am so good that when he plays 'Pay Day' it sounds jes 'xactly like the Boston Symphony Orchestra playing 'The Rosary.' "

The second negro replied, "Why, nigger, you aint got no bugler a-tall. When Snowball Jones, dat bugler of mine, wraps his lips roun' dat bugle and plays 'Mess Call,' I looks down at mah beans and says, 'Strawberries, behave; you're kickin' de whipped cream out of de plate.' "

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"I don't like your heart action," said the medical examiner. "You've had some trouble with angina pectoris."

"You're partly right doctor," said the applicant, sheepishly, "only that ain't her name."—College Humor.

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Little Ada—"Mother, shall I run out and post this letter?"

"No, child, certainly not. It's pouring in torrents, and not fit to turn a dog out of doors. Let your father go."

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Biddie: "Suppose you have been in the navy so long you are accustomed to sea legs?"

Middie: "Lady, I wasn't even looking."

Yachtsman: "If this squall continues, I shall heave to."

Passenger (wanly): "What a horrid way to put it."

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On a farm in South Georgia is posted this sign:

"Trespaser's will be persekuted to the full extent of 2 mean mongral dorgs which ain't never been ovarly soshibil with strangers and 1 dubbel barelt shot-gun which ain't loaded with no sofy pillers. Dam if I ain't tired of this hel raisin on my proputy."

□ □ □

There was a young person named Ned,
Who dined before going to bed
On lobster and ham,
And salad and jam,
And when he awoke he was dead.

GIVE THE MOSQUITO CREDIT—WHEN HE SEES AN OPENING HE DIGS IN.

FISCHER'S MAGAZINE



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355

APRIL, 1924

THE FELLOW WHO LIVES IN AN ATMOSPHERE OF CAN'T AND DOUBT EVENTUALLY SMOTHERS IN IT.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II APRIL, 1924 No. 6

He Forgot the Service

We met the vice-president of a large importing company on the train recently. An interesting chap, because he's always full of enthusiasm about his business. This time he talked typewriters.

"I can get," he said, "a folding typewriter that goes into the overcoat pocket, weighs three and one-half pounds, and does the highest grade of work you ever saw. By placing my order in Berlin for ten thousand of these I can lay them down in Chicago for $3.85 each. This means I can sell them as low as $15.00, and make a good profit."

A few days after this conversation we saw our friend again. We asked him about the typewriter venture. He smiled ruefully:

"Everything was all right except the *service*," he told us, "We could get the machines at the price, but could make no deal on the repair parts. I almost had given my order when it occurred to me that repairs might be needed occasionally. When I found I couldn't service the machines after they were sold, I knew the deal was off."

Everything was all right, you see—*everything but the service.* And *service* is our greatest asset: service that we have rendered to the thousands of Fischer Equipment operators which will retain their friendship and co-operation for all time, and which is making us many new friends each day.

Diseases of the Blood Vessels

B. B. Grover, M. D., Colorado Springs

ARTERIOSCLEROSIS is a condition characterized by a degenerative process going on in the arterial walls. The process is very slow, usually requiring years in which to develop. Its etiology is more or less obscure, which gives rise to many theories and conjectures. This being true, permits the speaker to advance a theory of his own, which is: All cases of arteriosclerosis not caused by specific infection are primarily due to faulty alimentation. The improper slitting up of the protein molecule sets free or forms a toxic substance which enters the circulation and causes an irritation of the pressor nerve fibers, resulting in narrowing the caliber of the smaller vessels, which entails an increased heart force to overcome the resistance. After a long, continued hypertension, changes take place in the muscular walls of the larger vessels.



Arteriosclerosis is often prominent in the vessels of the brain coronary arteries and the aorta and may be present when it cannot be detected in the vessels of the extremities.

Regardless of all theories of its etiology, it is a clinical fact that hypertension precedes the arterial changes.

TREATMENT—During its development, or the hyperpietic stage, much may be accomplished by autocondensation, combined with proper dietetic and hygienic management; if treatment be instituted during the early stages of hypertension, pathological changes in the larger vessels may be prevented. After the disease is well developed and cardiovascular changes have taken place, there is no cure, but still much may be done to prevent further changes by keeping the arterial tension within the safety zone, and this is accomplished by close observation, and occasional treatment by autocondensation and the adoption of such hygienic and dietetic measures that common sense will suggest. Treat

the patient how to live to avoid further changes in his vascular system that comfort may be enjoyed and his life prolonged.

The inroads of the disease can only be estimated by the symptoms present and they are not always a safe guide; therefore, it is always advisable to begin autocondensation treatment with a small dose or low amperage. The first treatment in any case should not exceed 300 ma., for a period of 10 minutes. There is no advantage in heavy doses at any time.

While preparing this paper I read in some journal a description of technic employed by an operator who should know better. It was about as follows: A tinfoil electrode, 4x8 inches (well soaped for contact), is applied to the nape of the neck. Over this a piece of block tin is applied, attached to one terminal of d'Arsonval by a rheophore, the other terminal being attached to the condenser chair pad, a current of 1,000 to 1,500 ma. is passed for 30 minutes.

While this technic might do very well in early stages of hypertension, if applied to a case of advanced arteriosclerosis that chance taken would favor a coroner's inquest.

Of all conditions treated by autocondensation, I know of none which calls for more caution in its application than in arteriosclerosis.

Let it be remembered that small doses for a long period of time are more effectual than large doses for any period of time. In the treatment of this disease there is no benefit to be derived by pushing the dose to a point causing perspiration, and, furthermore, the excitation of dilatation of the vessels of the brain might lead to a cerebral accident.

Sufferers from this disease are often annoyed by crampy muscles of the extremities and it may be the only symptom suggesting the disease. This condition calls for local diathermy. Be it remembered that its local application often yields constitutional as well as local effects; therefore, it is advisable to place both electrodes on the same aspect of the limb, the object being to heat the superficial tissues and

relax the spasm; subsequent treatments should include the affected muscles with electrodes on opposite sides of the limb with one electrode somewhat nearer the body. If the blood pressure be taken before and after the treatment, a reduction in the systolic pressure in most cases will be observed. Let me leave this thought with you: While the high frequency current is useful in arteriosclerosis, it is a potent agent equally capable of doing harm.

—*Medical Herald.*

The Employment of Some Forms of Electricity in Cardiovascular Diseases

By: Edward C. Titus, M. D., New York

* * * The newer type of High Frequency Apparatus enables us to introduce heat even into the deepest structures, and this too in a definite dose. When Diathermy is applied in sufficient quantity to the heart and greater blood vessels in cases of hypertension, the first effect observed seems to be upon the vasomotor nerves, evidenced by relief of vascular spasm and an equalization of the circulation, with increased elimination of toxic gases and solids from the fluids of the body. This is shown by the emanations from the skin and mucous membranes and by the increase of toxic products found in the urine after each treatment. One can readily appreciate the advantages of this procedure even in cases where extensive changes have occurred in the blood vessels.

* * * Dr. DeKraft says "High Frequency Currents enable us to raise the blood pressure when too low, as well as to lower it when too high. We know that there exist both vasoconstrictor and vasodilator nerves. It appears certain that as the result of a variety of toxic products generated in the human body we may have either an irritation of the vasoconstrictor or of the vasodilator nerve.

"The first effect of the great rapidity of the succeeding groups of oscillations is an intense heating of the surface of

the body and of the blood. This, in turn, stimulates the great system of vasomotor nerves resulting in peripheral dilitation of the blood vessels, and, at the same time, in stimulation of the sweat glands. It would appear that the sympathetic nervous system is stimulated in a most profound manner."

The effect of High Frequency Currents on the sympathetic nervous system is well illustrated by observations made by Sherbak. He employed Diathermy by means of two electrodes with a combined area of 57.5 square cm. The upper electrode was applied to the upper cervical vertebrae and the lower to the middle dorsal. From five hundred to seven hundred milliamperes were passed for five or six minutes. In a case of severe headache which accompanied right sided hemiparesis, hemianopsia with atrophic changes in the eye grounds and loss of hearing, twelve to fifteen applications relieved the headache. In another case of cerebral syphilis ten applications relieved the headache, hyperemia and the noises in the ears, and restored the patient to working capacity. It is interesting to note that the Argyll Robertson sign, which was present, disappeared after the treatment.

Equally good results were obtained in fifteen cases of functional disorders accompanied by circulatory disturbances in the head. In the majority of cases, the blood pressure, when above normal, was lowered after each treatment, and remained so after a number of applications. This author cautions against prolonged treatment in view of the marked circulatory changes produced in the cerebral circulation, which, he maintains, may cause anemia of the brain, low blood pressure and excitement. In my experience these symptoms do not occur if the Diathermy is applied directly through the brain. The value of Diathermy in arteriosclerosis of the brain is remarkable and permanent benefit has been noted.

Numerous observations enable us to assert that a normal blood pressure in an otherwise healthy person is never influenced by High Frequency Currents if employed in moderate doses. * * * * * *(Ext. N. Y. Med. Jour.)*

Diathermy in Surgery

Bianchini extols the advantages of diathermy in certain surgical cases, the absence of hemorrhage, the brief time required for the electrocoagulation, in comparison with operative measures, and the ease with which the procedure can be repeated in inoperable cases. The drawbacks are the danger of secondary hemorrhage as the eschar drops off, and the danger of injury of bone, with sequestrum formation. A complete cure was realized in nearly all the twenty cases of tumors, angiomas, keloids or adenoids he describes, but he emphasizes that diathermy is merely an aid to surgery, and cannot take its place.

—Policlinico, Rome. J. A. M. A., 1-19-'24.

Surgical Diathermy in the Treatment of Malignant Disease of the Throat

W. S. Syme, M. D.

During the last two years the author has used diathermy in treating malignancy of the throat and has found that it gives great relief.

More and more, surgical diathermy is being recognized as applicable and preferable to ordinary surgical procedures in malignancies of the mouth and especially in those of the pharynx.

The writer uses a flat plate wrapped in several layers of lint wrung out of saline solution and this is placed under the patient's buttocks. The active pole is in the form of a blunt knife (or a button for small growths), which is plunged into the tissues and the current closed. The blood vessels are coagulated, hence the operation is a bloodless one but when vessels the size of the carotid or the lingual artery are concerned it is better to use a temporary ligature. Complete removal is done at the time of the first operation. If glands are present they are removed later in the usual manner.

The author presented six patients whom he had treated by diathermy and in whom great improvement and relief had been wrought.

The advantages of diathermy are that it is practically bloodless and in disease involving the oropharynx no external operation is required to expose the growth. Absence of shock and pain is also a marked advantage and there is no risk at all of cell implantation as there is in operation.

Glasgow Med. J. April, 1923

Diathermy for Malignant Disease of the Mouth, Pharnyx and Throat

Norman Patterson, M. B., Ch. B.

Seventeen successful cases are reported. The author has been using diathermy in these conditions for more than eight years and the great majority of his cases were in an advanced state of disease. He has experienced no difficulty with severe hemorrhage in any case since he adopted the plan of ligating the main vessel supplying the part to be treated, when extensive treatment is to be given or when the patient has thickened arteries or high blood pressure.

If the primary growth is extensive, deeply rooted and in a locality unfavorable to its destruction, and especially if the secondary deposits in the neck are massive or fixed there is small likelihood of cure. An ulcer or an indurated area in the mouth or pharynx of a patient over middle age is more likely to be malignant than otherwise. Septic ulcer, cyst or gumma is often given as the diagnosis when the real trouble is epithelioma. It should be remembered that buccal or pharyngeal cancer will often give a positive Wassermann. If the glands cannot be dealt with it is of little use to apply diathermy to the primary growth except for palliation. If the area treated approaches or invades the fascial planes of the neck then there should be an interval of two or three

(Cont'd on page 10)

The New "Kolischer" Spark Gap

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Just return the enclosed postal card, and we will surprise you with a very generous offer. Yes, the "KOLISHER" Gap will fit your present Style "F," "F-O," Type "L" or "Military" Model without any alterations.

Reprints of Fischer Physiotherapeutic Meeting Almost Ready

After seemingly endless delays, we finally have all of the copy of the lectures and clinics given at the Logan Square Masonic Auditorium, October, 1923.

The book will be a great deal more voluminous than we had anticipated, and there is a lot of expense attached to the printing thereof. We have calls for about two hundred copies, but will not send the book to press until we know more definitely just how many are desired, as the cost of each copy will decrease slightly as the quantity is increased. The price will be about $5.00 each.

IF YOU WISH ONE OF THESE COPIES, DOCTOR, IT WILL BE NECESSARY TO SEND YOUR ORDER IN BY RETURN MAIL. You will find it well worth while and the best possible buy at the price asked. Use the enclosed postal for your convenience.

Program for Our Physiotherapeutic Meeting

Monday, May 12, 1924

We will have with us:

D. FRANK KNOTTS, M. D., of Chicago
Physiotherapeutic Case Histories . . 9:00 to 10:00 A. M.

MILES J. BREWER, M. D., Lincoln, Neb.
Medical Diathermy in General Office Practice
10:00 to 11:00

GUSTAV KOLISCHER, M. D., of Chicago
Surgical Diathermy in Malignancies
11:00 to 12:00 Noon

The afternoon from 1.30 until 4:00 P. M. will be spent at the Cook County Hospital, Harrison and Wood Streets, Chicago.

DR. D. KOBAK, Physician-in-charge of the Physiotherapy Department, will exhibit cases, therapeutic measures and the various technics employed in the work of that institution. This is a wonderful opportunity, and we are sure that many of our good friends will take advantage.

How to Get Here:

DRIVING—Follow Diversey Boulevard west to Western Avenue, then south to Wabansia Avenue; or

BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont; or

BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

We have ample space for all of you. Remember the date and come to our Lecture and Demonstrating Rooms at

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weeks between destruction of the primary growth by diathermy and the neck operation, otherwise fatal sepsis may occur. If the surgeon is in doubt whether he can make a thorough clearance from the neck then the gland operation should precede that upon the primary growth.

Brit. M. J., July, 1923

Physiotherapy With Special Reference to Diathermy

L. R. Gannet, M. D.

Electrocoagulation should be used only by the expert surgeon. Desiccation and fulguration are excellent for the removal of warts for carbuncles and polypi, but time and scrupulous cleanliness in the after care are necessary factors in securing results.

A case of Bell's palsy is cited in which the thermolite used for thirty minutes and followed by the ultraviolet for four minutes at a distance of 36 inches for two days in succession was followed by the electrode with a very short spark gap for ten minutes on the second day, until the time was gradually increased to twenty minutes. After the third or fourth treatment the pain ceased and after twelve treatments the patient was cured and has remained so for three months to date.

Deafness and tinnitus aurium are often helped by the static brush discharge, and it is beneficial in cases of sprain and bruise. Patients should not be given too long a treatment the first time, but a treatment of less than 20 minutes' duration will be disappointing in its results. Likewise if the machine is not kept clean, light, dry, well aired and well oiled, results will not be good.

For successful treatment a high frequency outfit producing from 1,000 to 4,000 ma. is necessary, with insulated rheophores and sheet metal for making electrodes.

The effect desired and the skin tolerance of the individual patient will determine the strength of the current to use. Technic is given for application and treating the head, trunk, thigh and upper arm.

Diathermy may be made either sedative or stimulative and if improper technic is used the patient will get only a condenser discharge which will increase rather than diminish the pain. Diathermy is useful in all forms of arthritis and neuritis, bronchitis, pleurisy and pneumonia and in joints and muscles rigid from disuse. It is also an aid in treating catarrh of the gall-bladder. It is not, however, a cure-all and calls for knowledge in its use, e. g., if used in pressure of encapsulated pus the wall will break and metastatic abscess will result. Ultraviolet in rickets and anemia and as a protection against X-ray burns is recommended. For the latter purpose it is used immediately after X-ray treatment and every two or three days in between.

At the present time one of the great obstacles to progress in physiotherapy is the lack of any facilities for learning the principles and practice thereof.

—Med. Woman's Jour. 30:355-358, Dec., 1923

Arthritis Deformans

One of our readers has asked for an opinion regarding the application of Diathermy in cases of Arthritis Deformans. We are indebted to D. Frank Knotts, M. D., of Chicago, for the very concise, pleasant communication which follows:

"I make it an invariable rule to give every patient a thorough examination before starting him or her on diathermy or auto condensation treatment, paying especial attention to elimination and the condition of the heart, kidneys liver and colon.

In arthritis deformans the elimination is always poor. When you liberate an excessive amount of toxins in the body with diathermy you must take the necessary pre-

cautions to eliminate them by the free use of laxatives and the drinking of several glasses of hot water daily, starting the day with two glasses one hour before breakfast.

In this condition diathermy should be given in sedative doses, starting your machine with 100 milliamperes, increasing the current 100 milliamperes at a time until you reach the amount you wish to give, and taking five minutes to bring up your current to this point.

The first treatment should be 300 milliamperes for 20 minutes, then gradually turn off your current. Increase the amount of current slightly with each treatment until you reach 500 to 700 milliamperes, which should not be exceeded in a patient of this type, and the duration of the treatment should not exceed 30 minutes.

I have observed in two patients a tendency to extreme nervousness and collapse after they had taken several diathermy treatments. Both were past 60 years of age, and of the debiliated type with a history of long standing toxemia. They complained of a feeling of profound prostration and had to be kept in bed several days, recovery being slow (in one case, about two weeks).

Hoping that you will find something in this letter that will be helpful to Dr. D....., I am,"

Yours sincerely,

Dr. Frank Knotts.

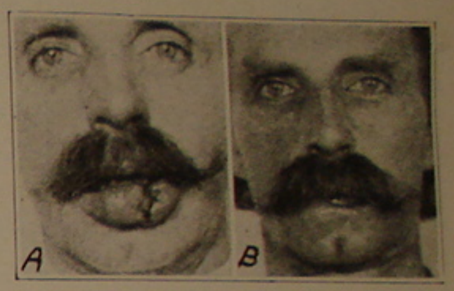
P. S.—I wish to emphasize that during the entire course of treatment with diathermy the kidneys should be watched closely.

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Did you read about the lady taking a bath who was nearly asphyxiated by a leaking gas heater? "But," says a newspaper account, "she was saved by the watchfulness of the elevator man."

Cancer of the Oral Cavity, Jaws and Throat

By William L. Clark, M. D., Phila.





Electrothermic methods are peculiarly adapted to the treatment of Cancer within the mouth. Malignant tissue (including bone) occurring in any part of the oral cavity, comprising the lips, buccal surface, tongue, floor of the mouth, alveolus hard palate, antrum, tonsils, pharynx, epiglottis, larynx, and proximal end of the oesophagus, may be destroyed with one electrothermic operation.

It is not necessary to split the cheek surgically to render a growth assessible to treatment, since the exposure secured by the use of a mouth gag, cheek retractors, traction on tongue by means of a suture or tongue forceps, or by the use of an endoscope is sufficient to permit the destruction of a growth. A tongue may be coagulated to the base and then excised without hemorrhage.

In addition to the desiccation or coagulation of tissues and the sealing of blood and lymph channels, the heat penetrates beyond the area totally destroyed and devitalizes malignant cells without impairing the healthy tissue, thus lessening the likelihood of local recurrence or metastasis and conserving the maximal amount of normal tissue.

Blood vessels encountered in the oral cavity are blocked by the current, and secondary hemorrhage rarely occurs. The efficiency of Electrothermic methods is increased in some cases by the judicious use of Operative Surgery, the Roentgen Ray and Radium. * * * *

Two hundred cases were treated by one or both of the Electrothermic methods or in combination with surgery, the Roentgen ray and radium. Surgery was used where the lesions were inaccessible to the current, when it required the incision of healthy tissue to expose the growth, or when it was necessary to excise the glands. In the majority of these cases the Roentgen ray, radium, or both had been used before without success, in which case these agents were not used again. When the Roentgen ray or radium had not been employed before, one or both measures were used in combination with electrothermic methods, when judgment indicated the wisdom of so doing.

—*J.A.M.A., Vol. 71. No.* 17.

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WE WISH to express our appreciation to our many friends for the scores of most pleasant letters received, commenting on "Fischer's Magazine." Space permitting, we would like to reprint all of them; here are a few esteemed samples:

"Your Magazine is surely a supply of 'Helpful Hints' from cover to cover, and is greatly appreciated by me."

Geo. E. Black, M. D., Akron, Ohio.

"Your Magazine is very interesting, and I enjoy reading it. In fact would miss it very much if it should cease to come."

J. D. Palm, M. D., Brockton, Mass.

"I am receiving Fischer's Magazine regularly, and appreciate it very much." *E. O. Harrold, M. D., Marion, Ind.*

"Your February issue of Fischer's Magazine at hand * * * I am indeed glad to be able to turn to this publication for enlightenment." *Chas. Phillips, M. D., Wake Forest, N. C.*

"Many thanks for your courtesy in sending me your Magazine, which I value." *E. F. Larkin, M. D., Bellingham, Wash.*

"Keep up the good work. Fischer's Magazine certainly fills a long-felt want, and is much esteemed by the writer."

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The result of combined knowledge and experience of eminent physicians and our engineering department.

This is something entirely new in sheet electrode material, composed of a body of very flexible alloy with a sheet of *pure tin* on each side. Electrotherapeutists will appreciate the fact that *pure tin* is placed in contact with the skin in preference to the lead generally supplied.

Each order of Sheet Block Tin will be shipped on a wooden roller, and packed in an individual container. This roller is to be retained, and used to remove the kinks and wrinkles from the electrode between treatments.

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Epitome on Blood Pressure

By Burton Baker Grover, M. D.

JUST OFF THE PRESS! This book is invaluable to the physician in general practice, indicating where to look for the **cause** of high blood pressure and pulse rate variations. Price $3.00, postpaid, including the "Key to Diagnosis."

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A PAGE OF FUN



A prominent figure in national life was walking down a street in Washington with his wife.

They passed a lady, very much younger than the wife and an ardent student of cosmetics. The stranger called to the statesman. He excused himself from his wife, stepped some distance away and had quite a long conversation with the young lady.

When he returned, his wife, very indignant, said, "John, who was that *woman?*"

He replied, "Sh! that's *exactly* what *she* wanted to know about *you.*"

□ □ □

He: "Tough luck! Ten miles from town with a blowout and no jack."

She: "Didn't you bring your check book?"—*Whirlwind.*

□ □ □

Lady: "We saw the advertisement about this house being for sale and we've come to see it."

Owner: "Yes, madam; but after reading the ad writer's description of it we have decided not to sell."
—*Passing Show.*

□ □ □

"They call that girl Spearmint."

"Why; is she Wrigley?"

"No, but she's always after meals."—*Bison.*

He: "We are now coming to a tunnel. Are you not scared?"

She: "Not a bit; take the cigar out of your mouth."

□ □ □

Mother (looking through the magazine): "Darling I see from satistics given here that every third baby born in the world is a Chinese."

Father (fondling his first-born): "Then thank goodness this is our first!"

□ □ □

Short-sighted Lady (*in grocery*): "Is that the head cheese over there?"

Salesman: "No, ma'm; that's one of his assistants."

PUT YOUR SOUL INTO YOUR WORK AND YOU PUT YOUR WORK INTO YOUR SOUL.

FISCHER'S MAGAZINE

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MAY, 1924

SUCCESS CONSISTS NOT SO MUCH IN SITTING UP AT NIGHT, AS BEING AWAKE IN THE DAYTIME.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II MAY, 1924 No. 7

A Few Pointed Paragraphs

"**Stanford Medical College of California** announces a course in **Physical Therapeutics** to occupy a part of the third year curriculum of undergraduate work. A six months' course is now available at the same University Hospital to any graduate in medicine who has completed at least one year's hospital work in medicine and surgery."

"**Columbia University** is contemplating extensive laboratory equipment and apparatus for their Medical School. The **Harvard School of Medicine** has announced a graduate course in Physiotherapy."

"A course of lectures on **Physical Therapeutics** has been for some years a part of the undergraduate work at the **University of Pennsylvania** and **Jefferson Medical College of Philadelphia.**"

"Instruction in these modalities is being given in **McGill University** in **Canada.** The **Army** is running classes in **Physical Therapeutics** for the proper education of physiotherapy aides for the **Government Hospitals.**"

"The **Lane Medical Library** at San Francisco is arranging a collection of reprints on **Physical Therapeutics** readily available to physicians and medical students, as a stimulation to acquire the best knowledge of this essential adjunct to medical therapeutics."

"A course in **Physical Therapeutics** has been organized in the **Medical School** in the **University of Brussels.**"

"The day when Physiotherapy was looked upon as of doubtful propriety has passed away. It has come 'into its own' as a recognized classic branch of the art of healing."

"WISE MEN PROFIT BY THE HANDWRITING ON THE WALL."

Treatment of Hemorrhoids by Electrolysis

By H. W. SIGMOND, M. D.
Crawfordville, Ind.

At one time there was confusion as to the true nature of this affection. It is now generally recognized as a pathologic condition involving, primarily, the blood vessels about the termination of the bowel. When Bodenhamer employed the term "hemorrhoidal disease," he adopted the most appropriate designation the affection has ever received. The simplest and best clinical definition that we can give and correctly state what we mean would be: "Hemorrhoids or piles are tumors originating in a pathologic condition of the hemorrhoidal blood vessels."

The cause of hemorrhoids are predisposing and exciting. The predisposing causes are: the upright carriage of man. He maintains the erect attitude for about two-thirds of the twenty-four hours. Climate and season are also factors, occurring as it does least frequent in mild or temperate climates, because the torrid climate has a tendency to diarrheal affections and in very cold regions the act of defecation is postponed or unduly hastened, thus leading to constipation and straining. Diet and habit are also causes. Overeating, particularly of rich and highly seasoned foods and the use of alcoholic beverages are conducive to hepatic engorgement, constipation and intestinal toxemia. The middle

period of life is the age most affected. As for sex, they are generally more prevalent in the males, owing to their heavy lifting and hard work.

Exciting causes are constipation and the act of defecation. In constipation the stools always require strong muscular effort to expel the contents in a direction opposite to the return blood current. Straining at stool, purgatives and other drugs, certain articles of diet, pregnancy, parturition and tight lacing are all exciting causes.

In this paper we will use the classification of external and internal hemorrhoids:

By external hemorrhoids we mean all of those situated below or upon the distal side of the muco-cutaneous line. They are either covered by the skin or skin and muco-cutaneous tissue of the anus and are fixed in their position outside of the external sphincter muscle.

Of the external pile we have the varicose pile, the thrombatic pile and the connective tissue pile or tab. For the external piles some have recommended positive galvanism. My experience has not been very satisfactory with it. Under local anesthesia I find that one can remove the clot or cut off the cutaneous tabs without much pain or discomfort. In fact, I can do it quicker surgically than by electrolysis.

Internal hemorrhoids are located above or upon the proximal side of the muco-cutaneous line and invested wholly by mucous membrane. It is dealing with these that our electrical treatment is the treatment of choice.

If the operator has a good galvanic outfit and understands the polarity effect he can get excellent results, does not confine his patient to bed, does not run the chance of an infection and does not expose his patient to the dangers of an anesthetic.

In order to secure the desired results the action of the two poles must ever be borne in mind. Electricity is a dependable

agent, acting in its various forms according to well known laws which must govern its uses. The special properties of each pole are physical and therapeutic. Each is the opposite of the other. Thus at the positive, oxygen is produced; at the negative, hydrogen. The positive produces an acid condition; the negative, an alkaline. Positive is a vaso-constrictor and stops bleeding, while the negative is a vaso-dilator and favors it. The positive is a dryer of tissue and hardens it while the negative produces moisture and softens it. The positive exerts a sedative influence while negative irritates it. The positive coagulates the albumin of the blood while the negative liquifies and disintegrates organized structures.

There are several methods of treating hemorrhoids electrically, and all of them have their advocates. On the other hand, all methods are condemned by those whose experience with them has not been satisfactory. I have tried several methods, but prefer the positive pole, using the needle. The preparation of the needle is as follows: (1) Take an ordinary cambric needle and insulate it by winding silk thread around it from one-fourth inch from the eye to within one-fourth inch of the point. (2) Stick the point of the needle into a cork for about one-eighth of an inch, thus leaving one-eighth of an inch above the cork. (3) Shellac the needle from the upper end of the thread down to the cork, thus leaving the part above the thread unshellacked and uninsulated to fit into the needle holder. The part in the cork is also uninsulated. After the shellac has thoroughly dried, remove the needle from the cork and it is ready for use.

For local anesthesia use quinine and urea hydrochloride or novocain. Inject the pile and wait a few minutes for the anesthesia to take effect. The negative pole is attached to a large moist pad and strapped to the abdomen so as to make and keep good contact, thus assuring one of a steady current, because if the current breaks it is uncomfortable to the patient. Attach the positive pole to the needle and insert the needle in the pile. Insert it into the top of the pile

carrying it up to the thread; thus your uninsulated point is in the pile. The idea of the thread is to make a shoulder to prevent your inserting the needle too deep and by using the thread for a guide you can always know that you are just in deep enough and not beyond where you want to stop. The shellacked insulation is in the wall of the pile and your current then goes into the pile. Use about ten or fifteen milliamperes until the pile gets a decided blanching or ashy appearance. Puncture the pile as near the top as possible, because if you get too close to the base, you get more after-pain.

For about two days you will notice no decided change in your patient, but on about the third day you will see a smile of satisfaction. Always warn your patient that it will be a day or so before you expect much of a change and he will not be disappointed at not getting immediate relief.

Treat each pile separately, using a new needle for each pile, because the positive pole causes the needle to roughen, deteriorate and thus it will break off when used the second time. A good way is to treat one pile at a sitting; however, some treat all of the piles at one time. This I believe causes too much strain on the patient; whereas by treating one pile at a visit he notices no inconvenience.

It is necessary to have an assistant as you need some one to hold the speculum while you guide the needle with one hand and turn on the current with the other.

There are various specula on the market that can be used to bring the pile into view so one can use the instrument to which he is most accustomed.

It must be remembered that this treatment is not a panacea for all rectal troubles, but for all internal piles that are not of the fibrous variety you can assure your patient of a cure.

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*Read at the Thirtieth Annual Meeting of the American Electrotherapeutic Association.

Endothermy in the Treatment of Accessible Neoplastic Diseases.—WYETH (*Ann. Surg.*, 1924, **79**, 8) says that desiccation was devised and has been so brilliantly developed by Clark of Philadelphia. The desiccation spark is not hot enough to carbonize, but is of sufficient heat to cause rapid dehydration of the tissue, rupturing the cell capsule and converting the area treated into a dry mass. Moreover this method destroys tissue without opening blood or lymph channels and will act as a styptic when there is oozing of blood. It is impossible to over-estimate the importance of the fact that with endothermy the growth is removed as a necrotic mass instead of as a group of viable cells. An important difference between endothermy and all other methods of cauterization by heat is that in endothermy the active electrode is cold when applied. Heat comes from within by the resistance of the tissues to the current. The three most important neoplastic tissues, tuberculosis, benign and malignant neoplasms, and syphilis all yield to this treatment. Cases are cited in full through article.



Fig. 1



Fig. 2



Fig. 3



Fig. 4

Figures 1 and 2—Basal cell epithelomia of nose. Given single treatment by monopolar endothermy under local anaesthesia. Figure 2 shows same case fourteen days later; lesion completely healed.

Figures 3 and 4—Large basal cell epithelomia of left ear, involving cartilage. Figure 4 shows good cosmetic result after treatment by monopolar endothermy, under ½ per cent novocaine.

Endocervicitis

By W. D. CHAPMAN, M. D.

Dear Mr. Fischer:—

I have your inquiry enclosing letter from Dr. W. F. Stanton of Washington, D. C. I will give you the technic for treating the condition very briefly and if the doctor wishes more detail, I will be very glad to furnish it. I will not attempt to discuss the pathology of endocervicitis, as that can be obtained from any text-book and is already understood by Dr. Stanton, but will say that in this, as in all other inflammatory conditions, the acute cases are more amenable to treatment than the chronic, and require less variation in the technic employed. I have experimented widely in the treatment of such conditions, and recommend the following procedure:

Take a Morse Wave vaginal electrode, lubricate it with glycerine and insert within the vagina. The Morse Wave sigmoidal or prostatic electrodes will do, but are not as effective as the larger vaginal electrode. This electrode is attached to the D'Arsonval connection. For the larger indifferent electrode, either block tin or wire mesh should be used. This electrode should be four or five inches in diameter and is placed on the abdomen with its lower edge about one inch above the symphysis pubis and midway between the anterior superior spines of the iliac bones. Both the skin and the electrode should be coated heavily with soap lather to insure a firm contact. This electrode is held in place by applying, first a towel, and then a light weight to prevent its slipping. The current is advanced slowly from 200 to 1000 or even 1200 milliamperes, is allowed to run for at least twenty minutes, and is then turned off gradually. If the smaller sigmoidal or prostatic electrode is used, the patient will complain of being uncomfortable when the current reaches about six hundred milliamperes.

In acute cases, these treatments should be given daily at first, but in chronic and sub-acute cases every other day is sufficient. It takes from three to eight weeks to cure a case of this kind.

Before coming for treatment the patient should take a hot cresol douche allowing the water to flow into the vagina for at least fifteen minutes. This not only cleanses, but has an important therapeutic effect. The uterus is at first engorged with blood, but soon becomes contracted down, much the same as the skin on a person's hands will do when held in water for some time. This helps to dislodge slugs and mucous and prepares the field for the diathermy treatment. This is a very important part of the treatment, and the patient should be instructed to carry it out religiously.

The above technic will prove effective in treating almost all inflammatory affections of the vagina, uterus or adnexa. There are a number of complications, however, that require special procedures. Chief of these are erosions of the cervix, and pus tubes.

1. I treat mild erosions of the cervix with the water-cooled lamp giving five to eight minutes at an eight-inch distance. If granulations or papillomatous tissue is present, it should be removed by fulguration. For this work, properly fitting glass speculae are essential. (See page 79, H. G. Fischer & Company Style "FO" Book of Instructions.)

2. A careful examination should be made for pus tubes. The high frequency current acts as a poultice on these and will flare up an old pyosalpinx that has lain dormant for years. The first symptom of this calamity is pain in the lower abdomen, followed in severe cases by chills, fever, and later peritonitis. I have had one or two emergency operations on account of this, but since coming to understand the condition, I even treat these pus tubes using the technic mentioned above, and have effected numerous cures. If this complication is recognized in time, it can be arrested by

(Cont'd. on page 10)

Program for Our Monthly Physiotherapy Meeting

Tuesday, June 10, 1924

These clinics and lectures that we have been putting on the calendar of late have created so much pleasant and favorable comment that their success and continuance is assured.

We will have here with us on June 10th some especially interesting lecturers, with mighty interesting talks:

L. C. Sammons, M. D., of Shelbyville, Indiana, will deliver an address on:
Physiotherapy in General Office Practice....10 to 11 A. M.

Gustav Kolischer, M. D., of Chicago
Principles of Medical Diathermy.....11 to 12 Noon

L. A. Bolling, M. D., of LaFayette, Indiana
Physiotherapy in Orthopedics.....1:30 to 2:30 P. M.

Frederick H. Morse, M. D., of Boston, Mass.
The Comparative Value of Galvanism and Diathermy
.....2:30 to 3:30 P. M.

Burton B. Grover, M. D., of Colorado Springs, Colo.
Blood Pressure .....3:30 to 4:30 P. M.

DRIVING — Follow Washington Blvd. west to Oakley Blvd., north on Oakley to Wabansia Ave., and one block west, or

BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont; or

BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

We have ample space for all of you. Remember the date and come to our Lecture and Demonstrating Rooms at

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putting the patient to bed and applying the ice-bag to the lower abdomen. If the pain is severe, it can be controlled by a small dose of morphine.

Dr. Stanton mentioned using the urethral electrode with the thermometer attached. Such an electrode is illustrated and described on pages 112 and 113 of Dr. Sampson's "Physiotherapy Technic." A number of physicians have reported splendid results obtained by introducing high frequency electrodes inside the cervix, but, in my hands, all treatments requiring the introduction of instruments or medicines inside the uterine canal have been failures. I believe that the condition is invariably aggravated by such treatment, and I have abandoned it entirely.

There is a definite reason why such treatments are not successful. One of the fundamental laws of medicine is to place all inflamed parts at rest, and, the slightest irritation to the uterine mucosa will set up uterine contractions, produce an excess of secretion, and, in that way, off-set the very results that we hope to attain. I have lately tried out the bismuth paste injections advocated by Hollender for chronic endocervicitis, but with mediocre results. The introduction of electrodes into the cervical canal is a bad practice and should not be done except in a few rare conditions. In case of pregnancy, it invariably results in an abortion, and almost all inflammatory conditions are aggravated instead of benefited by the treatment.

I have attempted to give in a general way, the technic employed in this clinic in the treatment of endocervicitis. The same technic may also be employed in the treatment of vaginitis, endometritis, and in selected cases of salpingitis. It is impossible, of course, to cover the field entirely in a communication of this kind, but I will be glad to answer any further questions that Dr. Stanton may care to ask, and will favor you with a more elaborate discussion at a later date if you care for it.

Very sincerely,
(Signed) W. B. CHAPMAN, M. D.
Carthage, Mo.

Lloyd B. Foster, M. D., of Walters, Okla., writes at length in "The Medical Herald and Physiotherapist" on the treatment of stricture of the esophagus.

He mentions a case, woman of 28. "Under the fluoroscope, using an opaque meal, after one glass of the material had been taken, there was a slight bulging of the esophagus in the region of the diaphragm with an apparent stricture which was very smooth in outline and I was unable to detect any evidence of external pressure that would produce such a deformity. At this time I was unable to detect any Barium in the stomach, but after about five minutes saw the Barium making its way through the stricture on towards the stomach which was very low. The stomach was found to lie in the pelvis, that is the lesser curvature being slightly below the anterior superior of the ilium and the greater curvature seems to lie at the very lowest point in the pelvis that it could obtain. Patient was given atrophine sulphate hypo, but this did not relax the stricture. Pressure made upwards on the stomach and to our satisfaction found out that by this means the stricture relaxed and the Barium came through.

Diagnosis:

1. Gastro-optosis marked.
2. Functional stricture of the Esophagus.
3. Psycho-neurosis.

Treatment: Put the patient to bed, elevating the foot of the bed about 18 inches, put her on a liquid and semi-solid diet with forced feeding. Gave bromide sodium and tr. belladonnae; kept bowels open with enemas; after four weeks of this treatment I found that while she had not gained any in weight, she had not lost any, but I could see no improvement.

I began to use Diathermy, placing a five-inch electrode on the back at the fifth dorsal and a three-inch electrode over the lower end of the sternum and using between 900 and

1,000 M. A. for 15 to 20 minutes each day. The first treatment was given about 4 P. M. and the patient retained all her supper that evening and has been improving and gaining in weight with only an occasional regurgitation of food, and I believe that Diathermy accomplished more in this case in one week than any other treatment could possibly have done.

Try this same treatment in the next stubborn case of hiccoughs and you will be surprised how quickly it will stop them."

The Rational Treatment of Facial Paralysis

By William Martin, M. D., Atlantic City

* * * If we think of a Neuritis in the terms of an inflammation of a more or less active type, we can see how the inevitable inflammatory exudate or infiltrate must be deposited along the nerve within its sheath and contiguous tissues. If we also consider the bony canal through which the nerve passes and the parts of the head to which it is distributed, we can readily see just what even a small deposit of exudate at just the right spot will do by cutting off the nerve cell nutrition and impulses, and naturally the effects are felt at all or most of the areas of distribution.

One point of selection appears to be at its exit at the stylomastoid foramen, and here a small deposit of exudate will quickly produce the paralysis. As the bony canal does not yield to such deposits, and being so narrow, it would follow also that such infiltrate at any point within this canal would bring about the same effect. The amount of paralysis will largely depend upon the amount of infiltrate, although this cannot be considered as absolute.

Granting that we have an infection, tooth, tonsillar or whatever, we will find a circulatory stasis and nerve irritation

which becomes an inflammation with the tendency to deposits of exudate. This may be slight at first, not sufficient to cause pressure, but let the person be exposed to some sudden chill of the face as a cold draft, and the inflammation becomes at once active and the deposit will be rapidly increased with the sudden appearance of the paralysis. It just needed this "last straw" to bring this on, and naturally it would be presumed that the draft really did the work, when only it was a contributing factor. In some cases of sudden paralysis there may be simply a congestive condition, the result of a mild infection, and the paralysis in this case would be from the usual swelling of the tissues. These are the cases that restore spontaneously without treatment. A recurrence will probably cause the inflammatory type with less tendency toward restoration.

* * * Neglect of early attention may be the cause of contractures that will be difficult to overcome. If possible to institute the treatment the very day of its occurrence, the better off the patient will be. The writer recognizes that this is contrary to the accepted teaching of neurologists the world over from time immemorial, for it has been thought that the "do nothing" treatment was the only thing until at least two weeks had elapsed and then *electricity might be tried.*

Wait until degenerative changes have started and then try to stop them by electricity! Think of it! Allow degeneration to start instead of preventing such an occurrence, and yet prevention is absolutely possible if the proper care is used. Continuous pressure upon a nerve trunk sufficient to cause pressure paralysis will not be overcome by allowing it to continue, but rather the tendency is to increase through additional deposits and become steadily worse. With this increased pressure degeneration must ensue after a time and muscle atrophy be the result. Almost every physician has seen these cases which are the natural result of such teaching. The time has come to call a halt to this.

What is the reason for this lack of proper teaching of modern Electro-therapy? Is it prejudice or is it indifference to anything that does not savor of the old-time thought? Surely we must do everything within our power to relieve and restore suffering humanity—else we are not true physicians. If we are in earnest about giving our best, we must look into modern methods; * * *

What is the rational treatment of this condition? The answer is, early treatment, the earlier the better, by modern methods of application of electrical currents or other physical methods in combination with them. Hyperemia is one of Nature's methods of restoration, therefore we aim to produce it in these early cases, and this can be done by the use of several measures. This activity of the circulation will reduce congestion and absorb the soft exudate, and may be all that will be necessary in light cases.

For this purpose we may use radiant light and heat, the properly hooded high candle power lamp being placed over the face at a distance that will produce active hyperemia without burning, and this treatment may be given two or three times daily for a considerable length of time, this being a matter of judgment.

In some cases of longer standing in which a more accurate hyperemia of a deeper nature may be desired, we have Diathermy, with which most physicians are now familiar. One electrode should be applied to the area covering the exit and main part of the nerve distribution, with the other upon the opposite side of the face, using a moderate amount of current, and watching its effect. Properly used there need be no untoward effects.

(*Extract from The Ambrican Physician*)

□ □ □

"Diathermy is practicable in all instances in which ***heat produced within the tissues*** *of the human body appears to be desirable as a therapeutic factor.*

This item of ***generating the heat within the tissues*** *is the Paramount advantage of Diathermy over any other method."*

Gustav Kolischer, M. D.

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Just supposing we could have a nice cover made up that would not cost over a dollar and a half; would you want one, or not?

Please drop us a line—NOW—Don't procrastinate! Whether you want one of these covers, or not, let us have your opinion, anyway. Thanks.

A New Auto-Condensation Couch Pad

A well made, durable pad of black DuPont Fabrikoid material, measuring 22 inches wide by 62 inches long. The insulating material over the center electrode plate is of oiled silk and wool felt. The entire pad is about ¾ inch thick, and is designed for machines of medium voltage D'Arsonval output, as for example the Fischer Type "G" Diathermy unit.



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A PAGE OF FUN



Grandmother: "My dear boy, you've grown to be the living image of your father. You have your father's eyes, you have his nose, you have his mouth, and—"

Jimmy (gloomily): "Yes, and I have his trousers, too!"

□ □ □

"Daughter, doesn't that young man know how to say good night?"

"Oh! I'll say he does!"

□ □ □

"What did he die of, Mrs. Malone?"

"Gangrene, Mrs. Flannigan."

"Well, thank Hivin for the color, Mrs. Malone."

□ □ □

"Pa, where was Babe Ruth born?"

"Couldn't tell you, son."

"Where was Jack Dempsey born?"

"Don't know that, either."

"Pa will you buy me a history of the United States?"

Little Jane: "Mother, if baby was to swallow a goldfish would he be able to swim like one?"

Mother: "Oh, my heavens, no, child! It would kill him!"

Little Jane: "But it didn't."

□ □ □

Affable Clergyman (pinching a little boy's bare leg): "Who's got nice, round chubby legs?"

Little Boy: "Mama."

□ □ □

Professor: "Who was the greatest inventor?"

Student: "An Irishman named Pat Pending."

LUCK MEANS THE HARDSHIPS AND PRIVATIONS WHICH YOU HAVE NOT HESITATED TO ENDURE; THE FAITHFUL HOURS YOU HAVE DEVOTED TO WORK; THE APPOINTMENTS YOU HAVE NEVER FAILED TO KEEP AND THE TRAINS YOU HAVE NEVER FAILED TO CATCH.

FISCHER'S MAGAZINE



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357

JUNE, 1924

SMILE at your troubles today and you will laugh at them tomorrow.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II JUNE, 1924 No. 8

Physical Therapy in the Specialties

A month or two ago we drew attention to the growing tendency in ophthalmology and oto-laryngology to relinquish their character of surgical specialties and to assume their rightful role as specialties of medicine, in which surgery is to be regarded, as it is regarded in relation to medicine at large, as an emergency measure, a sort of *dernier ressort*. Ophthalmologists and oto-laryngologists are nowadays much more concerned with the functional conservation of the organs with which they deal, and with their systemic relationships than with the perfection of operative procedures; and palliative and ameliorative measures bulk much more largely in their treatment than it ever did before in the history of the specialties.

It is interesting and suggestive to note how increasingly important a part physical therapy is playing in this trend. We would not care to go so far as to assert that the recent rapid development of physical therapy is responsible for the departure, but there can be little doubt that the possibilities offered by these modes of treatment—now for the first time being developed in the capable hands of high-grade men—make the departure practicable. Under the older system of medicine the resources of the eye, ear, nose and throat specialist for curative treatment were exceedingly meager

and limited. Physical modalities have already added sensibly to these available resources, and the promise that they hold out for the future is many times greater.

One has but to glance over the contents of our own and other magazines devoted to the interests of ophthalmology and oto-laryngology to observe the steady increase of attention that is being paid to physical modes of therapy. The current literature of the specialties becomes more and more plentifully sprinkled with contributions on the subject, voicing a growing confidence in its clinical value. We would be the last to indulge in or to incite an over-enthusiastic attitude toward new and comparatively little-tried methods. Conservatism must always characterize the scientific man. But we cannot avoid the conviction that, in the hands of the men who are now developing it, physical therapy is destined to play a significant part in eye, ear, nose and throat work, and we shall watch with interest, and further as much as we consistently can, the sober discussion by which its claims must be established or disproved.

E. E. N. and T. Jour.

Physiotherapy in Orthopedics

By LOUIS A. BOLLING, M. D.
LaFayette, Ind.

In briefly sketching certain observations made under two government services—first two years in Orthopedics in the late war, and a year and a half recently in Physiotherapy in Washington and Baltimore for the Veterans Bureau, I am summarizing the work of other men more than my own. Furthermore, I wish to be understood as using both terms in the title in their broader significance.

With little limit to equipment and that, too, under direction of experienced officers, with trained aides, and with fair cooperation from ranking officers and staff in general, conditions were favorable for good work. The weak link being the subject, the patient—the ex-service man. In the first

service his cooperation was good. By the time the second service reached him numerous influences had broken down his morale, and had started him on a career of never-ending complaint, in short a patient for life. We have nothing in civilian practice analogous to this except State Compensation cases. More on this later.

In a broad sense Physiotherapy is ideal for most post operative and hospital cases, and so its range of usefulness here noted, applies in general civilian work.

As a follow-up for impaired muscles and nerves, ill-functioning joints—long confined in casts, splints or dressings, we had recourse to Hydrotherapy, Mechanotherapy, Diathermy, Massage, Bristow Coil, etc., to hasten reparative processes, break up fine, fibrous bands of *adhesions*, and stretch tendon, ligament and muscle back into normal relations.

Results in this immobilization type, without much tissue destruction, were uniformly good. Peripheral Nerve lesions, bone grafts and tendon transplants, when released from fixation and reparative processes, received frequent, gentle massage, active and passive exercises graduated under guidance. Later they were given increasing stimulation through various modalities—the Sine Wave, Bristow Coil, Morse Wave and others. Sensitive stumps from *Neuroma* or abrasions from artificial limb, Arthritis, Neuritis, Myositis and kindred affections fall within the range of Hydrotherapy, Heliotherapy, Diathermy, etc. Septic conditions of bones and soft parts, usually evidenced by discharging sinuses—once sequestrum is excluded by the X-Ray, are favorably met by Heliotherapy, both local and general.

All types of foot strain come within the range of possibilities for relief or improvement with various modalities in Physical Therapy; Diathermy, Whirlpool Bath, Mechanotherapy, Sine Wave, Massage and active exercises.

The temporary Orthopedic expedients for support are secondary to the measures above for restoration of weight

bearing balance, tone to muscle, tendon and ligament, with correction of gait, posture and footwear.

Sacro-iliacs, that nightmare of the physician! Once the X-Ray excludes Hypertrophic arthritis or some anomalous type of vertebral process, we may by combined Physiotherapy and Orthopedic means of support afford relief of symptoms and eventual discarding of support with cure.

This Neurosis was a pitfall in the Veterans Bureau Service. Some of the most rebellious cases were without history of trauma. Every recognized means of treatment and support were tried out on some, often to no avail. Among these were cases drawing liberal compensation and were doubtless frank "Gold brickers."

Scar tissue under ionization, whirlpool bath and massage almost uniformly improved. In using irradiation about scar tissue it is well to be mindful of its low vitality and readiness towards burns. Bursitis, both the simple form and that complicated by calcareous deposits often show brilliant results after Diathermy and graduated Mechanotherapy.

Neurasthenia, Psychasthenia and other unstable nervous conditions associated with any of the foregoing, can often be controlled or improved by judicious use of auto-condensation and "Tonic Hydro."

If we hope to gain a standing in Physiotherapy in referred industrial work, we will get it by two routes only—one corollary to the other. First, that it offers advantages and is superior to other means or methods in time and results, bearing in mind that the paramount consideration in the latter is *function*. Second, that it is profitable to the corporation or party paying to secure it.

If we shorten convalescence from a surgical trauma by two weeks with Physiotherapy and our charges balance or exceed two weeks more of compensation while patient is getting our treatment, I fear we are not destined for a big industrial clinic of referred stuff. The desideratum is to

make it profitable both to ourselves and the other fellow. Then business will come and our work become popularized to the end of being demanded. Can we attain this goal?

Finally, in any well regulated Physiotherapy Clinic today —private or hospital, I would insist on certain gymnasium features for developmental and corrective work. It need not be elaborate in apparatus. A small phonograph with a few good exercises under a little personal guidance may serve as your assistant in this oftentimes. Not all our clientele get out often to the links. Furthermore the stout adult or physical misfit of a youth who most need it recognizes his or her handicap and avoid public games. In our efforts to repair this human machine by simple, physical means let us not forget the lesson of the late war, namely our astounding high per cent of physically unfit. If we elect to help checkmate this evil by incorporating corrective measures as a logical part of our work—we may give it a standing with other departments in medicime second only to that of Preventive Medicine and Hygiene.

Progress in Orthopedic Surgery

Diathermy in Acute Poliomyelitis

Picard[1] calls attention to Wickmann's pathologic report concerning the important role which the edema of the meningeal structures plays in the pathologic and anatomic picture of poliomyelitis. Wickmann and Preiser believe that it is to a great extent due to this edema that the ganglion cells are affected and destroyed. The selection of certain parts of the spinal cord, especially the cervical and lumbar enlargement, may thus be explained on mechanical grounds. Preiser has advised performing a laminectomy in such cases, but few surgeons are willing to follow this advice owing to its considerable danger and uncertain therapeutic value. Picard has become convinced of the value of diathermy in reducing this edema. He uses two forms of application, the transverse for local lesions and the longitudinal for diffuse processes. He reports ten cases, seven of them of three or

four weeks' duration, two of seven weeks' and one of four and one-half months'. The author thinks that the immediate improvement setting in after a few treatments can be explained only by the beneficial influence of the diathermia on the pathologic processes going on in the meningeal structures. Picard recommends the method warmly, but with all reservation in regard to its mode of action, and confesses he has no scientific explanation of the apparently beneficial effect.

Bergamini[2] states that during the 1921 epidemic of poliomyelitis at Modena, Bordier's method of treatment was applied on an extensive scale, with encouraging results. This method comprises roentgen-ray exposure and diathermy, applied to the paralyzed limb to stimulate the circulation and initiate repair by electrotherapy. Its purpose is also to combat the later atrophy of the paralyzed muscle. It has been established *that a chilled normal muscle may simulate the reaction of degeneration, the same muscle when warm reacting normally.* This combined treatment was employed as soon as the subacute phenomena has subsided. Sixteen cases are described in detail, the ages of the patients ranging from 5 months to 6 years. Four of the children were practically cured; eight were decidedly improved and two only moderately. The two others failed to complete the course. The benefit seemed in direct ratio to the promptness with which treatment was begun. The best effects were realized when the time that had elapsed since the onset of the paralysis was not more than twenty or thirty days. The roentgenotherapy consisted of three sittings on consecutive days each month, exposing the site of the spinal cord in the lumbar or cervical region, depending on whether the arms or legs were affected. The dose each time was about 6 X units. The diathermy was applied in four or five ten-minute sittings in each series, with a 500 or 600 milliampere current. A month generally sufficed to overcome the hypothermia and bring the limb to an approximately normal temperature. It was then ready for the third part of the treatment, namely, rhythmical galvanization, to the

paralyzed muscles. Twenty daily sittings of from fifteen to twenty minutes were followed by thirty or forty days of rest. The current should not be over 3 or 4 milliamperes, but this electrotherapy should be kept up perseveringly for months and years if necessary. Considerable improvement had been obtained even when the reaction of degeneration was complete. This Bordier method conflicts with the old doctrine of immobilizing the limb, but Bergamini says that its success is unquestionable in poliomyelitis, whatever the patient's age, when applied before lesions have become irreparable.

1 Pickard, H.: Deutsch. med. Wchnschr. **49**:13-15 (Jan. 5) 1923.
2 Bergamini, M.: Arch. de med. d. enf. **26**:521 (Sept.) 1923.

(*Ann. of Surg.*)

Diathermy in Joint Injuries

HYDE WEST, M. D., F. A. C. S.
Surgeon, C. & N. W., Woodstock, Ill.

In presenting this paper it is not done so much with the idea of bringing forth anything new or original as it is to call the attention of the profession to a most valuable adjunct in the treatment of joint injuries. First let me say that diathermy is a name given to a high frequency current produced by a transformer of high voltage and low amperage and has been recognized for a number of years by physio therapeutists as a current of much benefit in various diseased conditions, but it has only been recently that the manufacturers have produced machines simple of operation yet powerful enough to stand up under hard usage and free from the objection of sparking either operator or patient. Electrodes also have been produced which greatly aid in the use of this current.

The machine used by the writer is a standard make operating off a 110-volt alternating commercial current, yet I believe a machine operating off a 220-volt current would be superior unless a stabilizer is installed to produce a steady flow of current.

By the use of diathermy heat is transmitted to the affected tissues without burning the cutaneous surface. This is accomplished by placing two electrodes made of zinc, nickel plate or block tin on opposite sides of the part to be treated and properly moulded to fit the surface. The effect produced is a non-inflammatory reaction stimulating the capillaries and lymph vessels, thereby producing absorption of tissue waste, blood clot and even the products of calcification.

The diseased conditions to which this form of treatment is especially adaptable are sprains, fractures near joints where damage is almost always sure to occur to the ligaments and soft structures, the various bursites, Harris, of New York, reporting 80% of cures of subacromial bursitis, many cases with calcareous deposits. Although I have not attempted to make use of this method in the treatment of fractures of long bones, I see no reason why it should not be successfully used as a relief of pain and to produce absorption of exudates, especially where there is much damage to the soft tissues. Care should be taken to see that the part to be treated lies directly between the two electrodes. The average treatment consists of 500 to 1,000 milliamperes for 15 to 20 minutes and given every day for the first few treatments and then two or three times a week.

I herewith report several cases showing its applicability:

Case I.—I. B., a woman age 59 years, presented herself complaining of a swelling around right shoulder, associated with moderate pain, tenderness and inability to abduct the arm. She could not remember injuring the part. X-ray revealed a cloudy shadow over acromioclavicular articulation. Six treatments, at first every other day and then every third day, entirely produced mobility.

Case II.—J. B., age 38 years, dislocation of shoulder. Treated by reduction and immobilization for one week. Then passive motion with diathermy every third day. Perfect use of arm in four weeks.

(Continued on page 10)

Program for Our Physiotherapeutic Meeting

Monday, July 14th, 1924

We will have with us:

W. B. CHAPMAN, M. D., of Carthage, Mo.,
"Diathermy in the Treatment of Endometritis and Endocervicitis." 10:00 to 11:00 A. M.

MILES J. BREUER, M. D., of Lincoln, Nebr.,
"Medical Diathermy in General Office Practice". 11:00 to 12 noon.

The afternoon from 1:30 to 4:00 P. M. will again be spent at the Cook County Hospital, Harrison and Wood Streets, Chicago.

D. KOBAK, M. D., will exhibit cases, therapeutic measures and the various technics employed in the work of that institution. This is a wonderful opportunity, and as the last trip to this hospital was so very enjoyable, we hope you will take advantage this time.

How to Get Here:

DRIVING — Follow Washington Blvd. west to Oakley Blvd., north on Oakley to Wabansia Ave., and one block west, or

BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont; or

BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

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Case III.—J. K., age 63 years, carpenter, struck back of elbow joint, developing a severe inflammation of the olecranon bursa. Consulted me one week later. Bursa full, inflamed and very tender. Relief of pressure afforded by aspiration of 4 c.c. of serous fluid. Four treatments given daily reduced the swelling and inflammation, the bursa appearing almost normal. The man then returned to his home in nearby city.

Case IV.—A. P., age 60, farmer; subacromial bursitis of six months' standing. Massage and application of liniments with internal medication having proved of no avail. Six treatments twice weekly reduced pain so man could sleep and was able to dress himself, motility improved but far from normal when he stopped the treatments. This case was severe and should have received daily treatments for first week, then three and two weekly for four to six weeks, but could not afford the time to come daily, and as soon as he was able to do his work again he discontinued coming. In this case no definite injury could be found as a cause. The man had badly infected tonsils which he was advised to have removed.

Conclusion.—Diathermy offers a most useful means of combatting pain and is a wonderful aid in restoring function in disease or injury of joints. It is painless and easy of application. No surgeon or institution treating industrial cases can afford to be without the necessary apparatus for the production of this current.

Reference: Harris—Jour. A. M. A., July 13, 1923.

Diathermia in the Treatment of Sterility

C. A. CASTANO and J. F. M. GOMEZ
La Riforma Medica, August 13, 1923

Women affected with genital hypoplasia always give a history of irregular puberty, either precocious or delayed,

with profuse menstruation, periods of amenorrhea, menstrual pain, mucous leucorrhea, general malaise, headaches, gastric and intestinal disorders, various muscular pains and nervousness. Such girls are hysterical, neuropathic, sometimes hypersensitive, sometimes apathetic, subject to crises of pelvic, of uteroovarian congestion, to insomnia, and so on. A puberty so stormy is the forerunner of a genital life constantly disturbed by congestion epochs and general commotions of a nervous character.

Thorough examination of such girls, destined to be sterile women, discloses various stigmata of heredolues, such as congenital mitroaortitis, vascular and circulatory alterations, and skeletal dystrophy, while inspection of the genitals distinctly reveals the origin of all these changes in maternal syphilis. Recognition and early treatment of this condition of genital hypoplasia consequent of hereditary syphilis makes possible the avoidance of faulty sexual development and of the resulting sterility.

In order to remedy the uterine hypoplasia, the sclerosed ovaries, and the sclerocystic ovaritis produced by hereditary syphilis, antiluetic treatment must therefore be conjoined with local measures, among which diathermia stands first. Diathermia favors development of the infantile uterus by provoking active hyperemia and in this way stimulating the nutrition of the tissues and quickening intracellular chemical reaction. The application is made by means of two large plates of composition metal, serving as the indifferent electrode, upon the back and abdomen and connected together, and in the vagina a metallic stem electrode adapted to the size of the passage. The current strength should begin at one to one and a half amperes and may be raised to two and a half, seldom more, the duration of a sitting being from three to forty-five minutes. The authors usually allow a month's interval after twenty treatments, and these are always suspended during menstruation. They succeeded in all of the ten cases treated in increasing the size of the uterine cavity and in bringing about regular menstruation.

Electro-coagulation as a Destructive Agent

By T. HOWARD PLANK, M. D.
Chicago, Illinois

The high frequency currents are so well known to this body that it would be a waste of time to discuss them. Their use as a destructive agent in confined to the d'Arsonval current for the coagulation of large masses of soft tissue, and for the destruction of bones, and usually for cavities because of its greater adaptability and the ease with which it can be insulated.

Desiccation is confined almost entirely to the Oudin current and it is particularly adaptable to the treatment of small surface lesions where it is important not to leave large scars. This is especially true about the eyes, nose, and face. If desirable the epidermis may be removed without damage to the dermal layer of the integument which means without scarring. It is the current of choice for small growths as warts and moles (especially the brown moles of children), and for senile keratosis and caruncles.

The d'Arsonval current lends itself readily to the treatment of mouth, bladder, rectal, and vaginal diseases because of the ease with which it can be insulated provided the current is properly balanced in frequency, amperage, and voltage. Its use through the cystoscope is both reasonable and desirable for growths not larger than a fifty cent piece. For larger growths, it is best to work through suprapubic opening. For the vaginal and rectal cases, one should work through tipped, tubular glass specula of sufficient diameter and length to reach the growth easily. Aluminum needle applicators are most pliable, do not corrode, and are reasonable in price hence are used for this work.

A good hard rubber handle without metal surface, a light-weight flexible conducting cord, and a low quick-acting foot switch are all absolute necessities.

For mouth, throat, and tongue work, we use the d'Arsonval current with the same general equipment as for rectal and vaginal cases except that a Jennings' mouth gag is used in place of glass specula which with a catgut guy through the tongue, a wooden tongue depressor and the operator's fingers as retractors, complete the necessary outfit for doing thorough work. A good light is always essential. This may be a head-lamp, a reflected light, or direct lighting from a stand lamp. Each has its place and is desirable at times, therefore should be at hand.

For local anesthesia I use procaine or anesthane in 2 per cent solution or butyn in 0.5 to 1 per cent solution. The latter is of instantaneous action hence requires no waiting. For large growths where a general anesthetic is required, I use ¼ grain of morphine and 1–100 grain of hyosine hypodermatically one and one-half hours before operating repeating this same dose three-fourths of an hour later. This is for the average adult in average health. No bad results have come from its use. We have used this anesthetic on patients from sixteen to eighty-two years of age using only one dose in the age extremes and that one-half hour before operating.

For the destruction of soft tissues in the smaller lesions up to the size of a half dollar, we use about 700 milliamperes: for the larger rectal and in vaginal cases from 1,500 to 2,500 milliamperes. Where it is necessary to destroy bone tissue, I first destroy and remove the periosteum then place the point of the needle against the bone using about 1,500 milliamperes for a sufficient length of time to cause the bone to become incandescent. The destroyed bone is not removed at this time but is allowed to separate by natural processes which takes about three months. Soft tissue sloughs are loosened naturally in about two or three weeks.

Reasons for using the high-frequency currents: (1) When used, operations are bloodless. (2) Much less time is required. (3) There is very little shock. (4) There is a minimum of trauma. (5) The danger of metastasis is reduced

to a minimum. (6) Post-operatively there is very little pain, reaction, edema, or toxemia. (7) Resulting scars are soft and pliable. (8) There is perfect control to an area as small as a needle point. (9) Results are better than with cutting operations.

(*Am. Jour. Elect. and Rad.*)

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Physiotherapeutic Lecture Course

By MEL R. WAGGONER, M. D.
Cedar Rapids, Iowa

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Cincinatti, Ohio — Gibson Hotel

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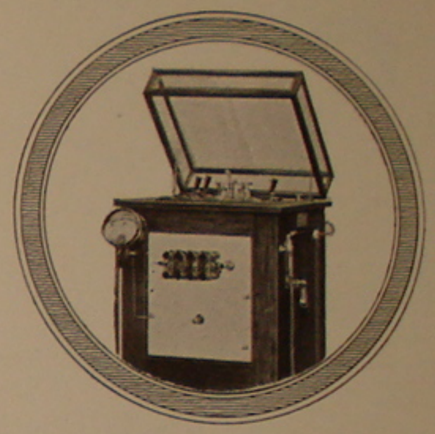
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A PAGE OF FUN



A Japanese Life Insurance Salesman at Los Angeles was asked to explain his splendid success.

"I go out into the country in my little car," he said.

"I see Japanese boy in field.

"I say, 'Come here.'

"I say, 'You carry life insurance policy?'

"He say, 'No.'

"I say, 'You damfool, sign here'."

□ □ □

Father: "How is it, young man, that I find you kissing my daughter? How is it, young man?"

The Lizard: "Great! Great!"

□ □ □

A window sign on Market Street, St. Louis—

Dr. Alexander
Treats all diseases
including children.

(Query: is Diathermy indicated?)

□ □ □

She: "What are you thinking about?"

He: "Same thing you are."

She: "Don't you dare move,"

A little girl who is just learning to read short words takes great interest in the big letters she sees in the newspapers. The other evening after she had kept her mother awake half the night reading advertisements to her, she knelt down to say her prayers:

"Dear Lord," she lisped, "make me pure." Then she hesitated and went on with added fervor, "Make me absolutely pure like baking powder!"

□ □ □

She: "I can tell a lady by the way she dresses. Can't you?"

He: "I never watched one dress."

PESSIMISTS are always in the rear and never in the van in the march of progress. Your successful men and women are never chronic grumblers.

—Bishop Samuel Fallows

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More complete announcement, with complete program will follow in subsequent issues of this paper.

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JULY, 1924

Loyalty—

If put to the pinch, an ounce of loyalty is worth a pound of cleverness.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II JULY, 1924 No. 9

The Precision of Physical Therapy

One of the specific reasons why surgery superseded therapeutics and almost elbowed it out of the arena was the superior accuracy of method and clean-cut results of the one as compared with the relatively uncertain, hit-or-miss character of the other. Medicine fired grape-shot from a blunderbuss; surgery performed accurate target-practice with a carefully-sighted rifle. Small wonder that profession and public turned impatiently from the vagueness of the one to the precision of the other.

This specific quality of precision and constancy, both in method and in result, has now passed again into the hands of medicine with the development of physical therapy. The electro-therapist knows, to the fraction of a degree, the strength of his current, and the path it will take; he can gauge its volume to the thousandth of an ampere; he can generate heat to or beyond the physiological limit; and in most instances he can know exactly what his treatment is accomplishing. Where, in other phases of medicine, or in surgery either for that matter, is such calculation possible? Compare the exactness of electro-therapeutic or radio-therapeutic applications to the uncertainty attending the average application of drugs.

This is but one of the qualities which gives to physical therapy the promise of a far-reaching usefulness in the medicine of the future. But it is a most important quality, and one which at once commends physical therapy to the modern

scientific physician, who, above all, demands accuracy and precision in the weapons that he employs.

While it is true that physical therapy, in its various modalities, constitutes, in a sense, a special form of treatment, and its technical development is necessarily in the hands of a specialized group of men, yet it is not, and must not be regarded as, a specialty of medicine in the sense that ophthalmology, or urology, or neurology, or similar branches of practice, are specialties. It is a mode of therapy for use in **every** department of medical practice in which, and to the extent to which, it is applicable. And from all appearances it promises to be applicable more widely and to a larger degree than almost any other mode of therapy.

There is not a physician in the entire profession from the general practitioner to the most exclusive specialist in the most specialized branch of medicine or surgery, but is interested in physical therapy, and will find it an invaluable (and ultimately an indispensable) aid in the cure and relief of his patients. This is, in fact, being universally recognized.

Amer. Journal of Physical Therapy

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Suggestions for the Treatment of Pulmonary Tuberculosis by the Ultra-Violet Ray

W. B. CHAPMAN, M. D., Carthage, Missouri

During the past few months I have been receiving an increasing number of inquiries relative to the use of the actinic or ultra-violet ray in the treatment of pulmonary tuberculosis. Most of these are from physicians who merely want to know how long and intensive the treatments should be, how often repeated, and how long continued. A few even ask what fee to charge. Many of these inquiries seem foolish, but I always answer them to the best of my ability.

During the past fourteen months I have treated some hundred cases of pulmonary tuberculosis in all stages, and must truthfully say that there is no prodecure that will apply in all cases. Some of these patients absorb huge quantities of the ray almost from the beginning, while others burn quite readily and must be built up gradually. Brunettes, as a rule, have a greater tolerance for the ray than blondes. Our rule is to expose the patient about ten minutes, front and back, to the deep therapy lamp before turning on the ultra-violet ray. This dilates the capillaries of the skin, causes the patient to perspire profusely, and, we believe, places the skin in a more receptive condition to receive the ultra-violet treatment. In the summer, when the patient is very warm already, this part of the treatment may be omitted. After using the deep therapy lamp, we dry the skin by a somewhat vigorous rub with a Turkish towel before using the ultra-violet. We believe this also helps by bringing still more blood to the surface.

In using the ultra-violet or actinic ray, we begin by raying the trunk and limbs at a thirty-inch distance, giving one minute for blondes and two for brunettes the first day, and increasing a minute each day until we reach ten minutes. We then decrease the distance of the arc from the patient about two inches each day until we reach fifteen inches. Sampson contends that the treatments should be extended to thirty minutes or more, but, where it is necessary to handle a large number of patients each day this is not practical. Furthermore, I have failed to secure better results from giving the long treatments. I have also read where it was considered an advantage to begin by raying, first the feet, then the legs below the knee, etc., gradually working over the entire body. I consider this technic impractical and without scientific foundation. It merely delays the results that one should hope to obtain. Whenever possible, these treatments should be given daily except in the presence of a a marked skin reaction, when the treatments should be discontinued until the erythema subsides. Patients that are

able to carry on their daily work, usually prefer to come about three times a week, and improve nicely when they come regularly. I have found from one to three months the average time necessary to arrest a case of pulmonary tuberculosis depending on the severity of the case.

Occasionally I receive a communication from some physician who does not feel that he is obtaining the results that he should expect. And on inquiry, I usually find that he is either careless in his technic or neglectful of his patients. These machines are constructed for one purpose only and that is to produce ultra-violet energy, and, beneficial as the ray has proved to be when used properly, it requires more than an inexperienced office girl to treat these patients and obtain satisfactory results. I am sorry to say that I have met a few physicians who think the only use of the machine is to extract a few dollars each day from some poor unfortunate, and turn the treatments over to the office girl with instructions to give them five or ten minutes under the actinic lamp and tell them to come back tomorrow for another treatment. I consider such a procedure criminal on the part of the physician. These patients should be examined daily, the proper medicines prescribed, the diet regulated, and minute instructions given relative to hours of rest, bathing, exercise, clothing, and everything that will tend to a successful issue.

Patients with advanced tuberculosis often become sick and cough and expectorate freely during the treatments. They also emit a disagreeable odor which is diagnostic of the condition and quite pronounced when the patient perspires freely. This odor is kept down only by scrupulous cleanliness on the part of the patient. It is undoubtedly caused by the throwing off of toxic material by the skin.

While I consider the ultra-violet lamp as nearly fool-proof as any modality that we employ in the laboratory, it requires more than merely turning it on for a few minutes and then turning it off to secure satisfactory results. Even where our instructions are explicit, I find that the improvement of the

patient is influenced quite markedly by the training and experience of the technician giving the treatments. Frequently patients drive the eighteen miles that separate our laboratories on days that I am at one or the other because they claim that they improve more rapidly when I give them my personal attention. I also notice that the old patients invariably request the services of the more experienced technicians. As stated above, it requires more than exposing the patients to the ultra-violet ray to obtain satisfactory results, and it is only where the physician studies his cases individually and checks his results carefully that the maximum of success will be acquired. (This same rule will apply to all other branches of medicine.) Ultra-violet energy is not a specific for tuberculosis, but is merely another asset to our armamentarium for carrying on the war against this dread disease. However, I consider it the most valuable contribution of late years, and hope to see it used universally within the near future.

This splendid article will be continued in the September issue.

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Massage and Indirect Diathermy in Fractures

We notice four very splendid paragraphs in the "P. T. Review" on the above, which we take pleasure in reprinting for you, herewith.

"When a bone is broken the surrounding structures are injured also. Rigid fixation by splints or plaster without physiotherapy withholds from these structures the treatment by which repair can be accomplished, and thus we have added to the original injury, adhesions and atrophy of disuse.

"Massage and indirect Diathermy in the first stage of a fracture hastens the absorption of the hemotoma and injured tissue cells, and improves the metabolism of the injured parts. Thus it diminishes the pain and

lessens the muscle contraction and consequently aids in the reduction and retention of the fragments. Fixation and rest diminish the blood supply, hence do not aid in the above.

"Joint motion in a limb where there is a fracture prevents joint stiffness and muscle atrophy. This mobilization does not tend to disturb the alignment of the fragments, unless the conditions are such that an open operation is necessary to restore the fragments to proper position.

"With massage, electrical muscle stimulation and joint motion, muscle atrophy and joint stiffness are prevented and the limb is ready for use when there is union. With complete immobilization there is marked muscle atrophy and joint stiffness and we get the result of a good union but a marked permanent disability from stiff joints."

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Treatment of Hypertrophy of the Prostate by X-Ray and Physiotherapy

By ORREN W. WYATT, M. D.
Manning, Iowa

The author describes symptoms, histories, examination and treatment very clearly, and says in part that the conditions found are so variable that it is difficult to describe the many types that may be found.

Where the involvement extends beyond the prostate, malignancy should be suspected. The differential diagnosis between benign and malignant prostatic disease is usually very easy in the latter stages in which the seminal vesicles, glands, perirectal and other pelvic structures are extensively involved. The early stages are more difficult to diagnose. Marked induration should always make one think of the possibility of cancer, and if this is of stony hardness, a positive diagnosis can usually be made.

In cases where a positive diagnosis cannot be made a roentgen ray cancer dose should be advised, and operative measures considered if it does not respond to the X-ray in a few weeks.

Cases of benign hypertrophy associated with marked chronic prostatitis, and especially with concretions and small calculi, are sometimes difficult to differentiate from cancer, and in such cases the method described above should be followed. The fact that about 20 percent of the cases of prostatic obstruction in elderly men are due to malignant disease, shows the great importance of early diagnosis, which is now seldom made. The presence of vague pains in the pelvis or lower extremities should always lead to an examination of the prostate, and if this were always done, many early cases of carcinoma would be recognized. Sarcoma of the prostate is extremely rare and has been characterized by a very large soft, smooth tumor, which occupied a large part of the pelvis. This should be treated by massive doses of roentgen ray.

Prostatic hypertrophy is nearly always due to the result of chronic infections causing chronic inflammatory changes. In this class of cases apply diathermia to the prostate, either direct or indirect, dose from five hundred to nine hundred milliamperes, time from 10 to 30 minutes, gradually increasing the dose. The prostatic electrode is placed in the rectum against the prostate, the other over the pubis. This is followed by an ionizing dose of Roentgen ray, and massage by the Morse sine wave, or slow sinusoidal, to squeeze out the debris from the prostate and establish better circulation in this organ. The prostatic electrode is placed in the rectum against the prostate, the other over the lumbo-sacral region. Also use the vultra violet ray, both local and general, for its antiseptic and general systemic tonic effect. The rapidity with which the acute symptoms subside often surprises even an experienced user of physical remedies.

Ext. from The Ur. & Cu. Review.

Physiotherapeutic Lecture Course

By MEL R. WAGGONER, M. D.
Cedar Rapids, Iowa

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Science has learned how to use heat, electricity, massage, active and passive motion to restore the bruised joints, muscles and nerves that result from disease or accident so that their use is in time restored.

Lord Lister Hosp. Bul., Omaha.

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Ready for distribution this month. A splendid hard-bound volume—6″ x 9″—almost 400 pages—every article original, and by well known authorities.

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Leather Binders for Fischer's Magazines

As a result of our announcement, in the May issue of this paper, we have had calls for something over a hundred binders for Fischer's Magazine, but will repeat our suggestion for those who missed the first notice.

Doctor, how would you like to have a nice leather or leatherette cover for your collection of "Fischer's Magazines" ?

Just supposing we could have a nice cover made up that would not cost over a dollar and a half; would you want one, or not?

Please drop us a line—NOW—Don't procrastinate! Whether you want one of these covers, or not, let us have your opinion, anyway. Thanks.

A Physiotherapy Treatment for Anemia and Amenorrhea in Young Women

By LEO C. DONNELLY, M. D.
Detroit, Michigan

This paper is based upon the assumption that anemia and amenorrhea are present in young women because growth and development has been too rapid and that the production of blood and tissue has been insufficient to meet the demands of puberty. Such young women may be well supplied with adipose tissue but the underlying tissues are often of poor tone so that they are unfit to compete favorably in school or business.

The treatment consists of; (1) general ultraviolet irradiations with the air cooled lamp and ultraviolet to any point of focal infection directly accessible to the water cooled lamp; (2) diathermia through the epiphyses of both femurs; (3) the use of a slow mechanical wave current over the nerve centers to stimulate the flow of blood and lympth through the uterus, ovaries, and fallopian tubes; (4) hygienic and (5) dietetic and other supportive measures.

The growing girl needs a large supply of calcium phosphorus and iron to produce new bone, connective tissue, blood, etc. It is empirically advisable to administer 0.1 grain thyroid extract plus 0.1 grain parathyroid extract daily, 0.5 gram of calcium carbonate daily, 20 drops of 100 per cent cod liver oil three times weekly and large quantities of milk and leafy vegetables. However, one is not sure that this is absorbed and stabilized by the system unless general ultraviolet irradiations of 2804 to 3022 Angstrom units are used. These stimulate the parathyroid glands which directly or indirectly act in conserving the availability of blood calcium in an ionizable as well as a combined condition thus influencing muscle nerve and other organ metabolism. Increase in blood calcium is demonstrable by blood chemistry examinations; it leads to an increased deposit of calcium in the bone which is demonstrable by the x-ray. An increase in the inorganic phosphate in the blood is shown by laboratory methods. Increased calcium, phosphorus and iron can be demonstrated clinically.

Following a series of ultraviolet irradiations the blood calcium index is raised, which would lead one to deduce that general ultraviolet irradiations would benefit the following diseased conditions in which the blood calcium index is below normal; tuberculosis, precancerous conditions, varicose, gastric, duodenal or any slow healing ulcer, tetany, puerperal eclampsia, chronic rheumatism, hay fever, asthma, hyperesthetic rhinitis, mucous colitis and eczema. Thirteen of the above conditions have been treated by the author. Other clinicians report favorable results from ultraviolet treatment in these conditions.

The spectral band of 2967 Angstrom units is the specific line of greatest value in calcium metabolism, according to Pacini.

First degree ultraviolet erythema doses are given over the front, back and sides of the patient, and are repeated as soon as the resulting erythema begins to fade. A series of these treatments besides increasing the ionizable blood calcium, also increases the amount of hemoglobin and the number of red blood cells, and produces a physiologic skin which is efficient in protecting the patient against quick changes in temperature and exposure to dampness, making it practically impossible for skin infection to exist or occur. This physiologic skin is of great aid in eliminating toxic material from the blood.

Following the general irradiations the patient lies on her face under a therapeutic lamp which is placed at a height that sheds a comfortable warmth. Twenty-two B. & S. gauge sheet lead electrodes are applied over the lower outer portion of both thighs so as to cover the epiphyses of the femurs. A similar electrode connects the inner portion of the thighs. The d'Arsonval high frequency current is al-

lowed to pass through the epiphyses for thirty minutes or more. The intensity is gauged by the toleration of the patient, a comfortable heat is optimum. This diathermy current should not be compared to the current of a small so-called violet ray apparatus. The red and yellow marrow of the long bones produce the red blood cells. Diathermy produces a greatly increased flow of blood and lymph through the epiphysis of the long bone and their temperature is raised. This rise of temperature plus the increased blood supply increases the efficiency of the metabolism of the red and yellow marrow of the long bones and more red blood cells are thrown into the circulation. The results compare favorably with the transfusion of whole blood, thus obviating a surgical operation.

The body of the uterus is supplied by the tenth, eleventh, and twelfth dorsal segments, the cervix by the third and fourth lumbar and sometimes by the first and second sacral segments, the ovary by the tenth, and the fallopian tube by the eleventh, and twelfth dorsal and first lumbar segments (Behan). These nerves come off at the levels of the seventh dorsal to the twelfth dorsal spinous process (Cunningham). Two moist electrodes covered with chamois skin are so placed as to stimulate these nerves and a slow mechanical wave current is given for twenty minutes which causes the uterus and tubes to alternately contract and relax, this greatly increases the flow of blood through them. It has been shown many, many times that this method of treatment can develop an infantile uterus to a normal sized uterus. This is especially valuable in overcoming sterility.

The results obtained from this treatment are gratifying both to the patient and the physician and much superior to the results formerly obtained.

Report of a case of anemia, amenorrhea and dysmenorrhea apparently cured by the above methods.

A doctor's daughter, age twenty-two, since the beginning of menstruation at the age of fourteen years would go

without menstruating for periods of three to eleven months. When the periods came they were associated with severe pain, cramps, passing of clots and mental depression. Although she was of good weight, her flesh was soft, she was anemic, easily tired and did not feel as well as she thought she should feel. Two of the treatments outlined above brought about a normal painless menstruation one week following the second treatment, and a second normal period occurred on time the following month; So far she has had four normal menstrual periods, and indications are that they will continue normal. Her general health and mental outlook have shown a corresponding great improvement.

Summary: 1. Stimulation of calcium, phosphorus, iron and endocrine metabolism are induced by ultraviolet rays.

2. Stimulation of red and yellow bone marrow metabolism is effected by diathermy.

3. Stimulation of the uterus, ovaries and tubes is produced by the sinusoidal current.

Those interested in calcium metabolism in relation to glands of internal secretions and ultravoilet would do well to read articles by Halverson, Mohler, Bergeim, Kramer, Tisdall, Brasch, Bach, Hess, Casharis, Howland, Huldschinsky, Pacini, Novak, Hollinder and many others.

While the author is not certain if any one else is using the same combination in treating this type of cases, he is certain that he did not originate any part of the treatment.

Am. Jour. Elect. and Radio.

□ □ □

High Frequency Treatment of Internal Cicatricial Strictures

Klinische Wochenschrift, September 24, 1923, vol. 2, p. 1796

While surgical intervention in cicatricial strictures of the esophagus, the ileum, the rectum, or the urethra is often brilliantly successful, there are many instances in which it is

inapplicable or is ineffective because of cicatricial formation following the operation. In its stead the author has used the method of applying heat by means of high frequency in esophageal stricture with such satisfactory results that he regards it now as the method of choice in all cases because of its freedom from danger, its bloodlessness, and its ideal result.

The basis of the method is the fact that cicatricial tissue can be vitalized by diathermia. This almost bloodless, hard, unelastic substance can be brought by high frequency to such a condition as to have a free circulation, and consequently to be soft and elastic, a condition not obtainable by any other physical means of applying internal heat. The internal electrode consists of a flexible metal bougie and the indifferent electrode may be so placed externally as to direct the current to the thickest part of the stricture.

Sometimes the result is brilliant. In a child receiving nourishment through a Witzel fistula after twelve days the esophagus becomes so soft and flexible as to permit of swallowing all kinds of food. Results in the author's cases are permanent.

H. PICARD

Laughs of Other Days

(From Benjamin P. Shillaber's "Partingtonian Patchwork.")

"Diseases is very various," said Mrs. Partington, as she returned from a street-door conversation with Dr. Bolus.

"The doctor tells me that poor old Mrs. Haze has got two buckles on her lungs! It is dreadful to think of, I declare. The diseases is so various! One way we hear of people's dying of hermitage of the lungs; another way, of the brown creatures; here they tell us of the elementary canal being out of order, and there about tonsors of the throat; here we hear of neurology in the head, there of an embargo; one side of us we hear of men being killed by getting a pound of tough beef in the sarcofagus, and there another kills himself by discovering his jocular vein. Things change so that I declare I don't know how to subscribe for any diseases nowadays. New names and new nostrils takes the place of the old, and I might as well throw my old herb-bag away."

Fifteen minutes afterward Isaac had that herb-bag for a target, and broke three panes of glass in the cellar window trying to hit it before the old lady knew what he was about. She hadn't meant exactly what she said.

(Copyright, 1924, Reproduction forbidden.)

Special Program for Our Monthly Physiotherapeutic Meeting

Monday, August 11, 1924

We will have with us:

MEL R. WAGGONER, M. D.,
of Cedar Rapids, Iowa

who will conduct a clinic on TONSILS and HEMORRHOIDS, exclusively.

The whole day, from 10:00 A. M. on, will be devoted to this work.

Dr. Waggoner's method should be termed "Electro-dehydration" rather than Electro-coagulation, and the severe oedema, swelling and suppuration sometimes following the latter method are entirely eliminated in the former. No anesthesia required—not even local, for this Dehydration process is not painful, nor is it followed by painful after effects.

COME, AND BRING IN A PATIENT—BRING ALONG MORE THAN ONE PATIENT IF YOU WISH.

How to Get Here:

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BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont; or

BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

We have ample space for all of you. Remember the date and come to our Lecture and Demonstrating Rooms at

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A PAGE OF FUN



Englishman (in poker game)—"Well, I'll wager a bally pound on this."
American Darky (holding four aces)—"Ah dunno too much 'bout yo' ol' English money, but I'll bump yo' a couple of tons."

□ □ □

First She: "Your husband has a clever-looking head. I suppose he knows practically everything."
Second She: "Sh-h—he doesn't even suspect anything!"

□ □ □

(From a story)—"She held out her hand and the young man took it and departed."

□ □ □

"Congressman, I want you to find a Government post for my boy."
"Is he intelligent?"
"If he were I shouldn't be worrying you for a Government job. I could use him in my own business."

□ □ □

"Why did you fire young Jones?"
"Spent too much time reading success stories."

□ □ □

"Look, papa, Abie's cold is cured and we still got left a box of cough-drops."
"Oo, vot extravagance. Tell Herman to go out and get his feet wet."

□ □ □

She: "I wonder if you remember me? Years ago you asked me to marry you.'
The Absent-Minded Professor: "Ah, yes, and did you?"

□ □ □

Englishman (watching an inter-collegiate dance): "I say, they get married afterwards, don't they?"

□ □ □

Salesman: "How many cigars do you smoke a day?"
Purchasing Agent: "Oh, any given number."

□ □ □

Big Bill Says:—
I recently read a book on Insanity but stopped in the middle of it because it became entirely too personal.

A man should never be ashamed to say he has been in the wrong, which is but saying in other words that he is wiser today than he was yesterday.

—Pope

Important Announcement

Our plans are taking shape, and we have succeeded in obtaining the services of some of the best known Physiotherapeutists in the country for the Chicago meeting.

Arrange that the dates

October 20-24

inclusive, be set aside for the greatest meeting of Physiotherapeutists of all time.

FISCHER'S MAGAZINE



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359

AUGUST, 1924

THE question for each man to settle is not what he would do if he had means, time, influence and educational advantages, but what he will do with the things he has.

—Hamilton Wright Mabie

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II AUGUST, 1924 No. 9

Modern Alchemy

The alchemists of olden times carried on weird and mysterious experiments in the vain effort to transmute the baser metals into virgin gold. Such experiments came to naught and their dreams have never been realized. But how much more wonderful are our transmutations of today in the fields of human thought and scientific achievements.

Into the minds of men are forever and ever entering impressions and sensations which are changed in form and substance and transmuted into wonderful expressions. Into the mind of a Marconi enters the germ of an idea—with the wireless and the marvelous manifestations of the radio as a result. Can anyone visualize or grasp the sum total of human progress as represented by the names of Pasteur, Roentgen, Morse, Bell, Edison, Watt and the Wright Brothers?

A composer of music influenced by the grandeur of an ocean sunset, a lovely pastoral, or a momentary glimpse into the depths of a human heart, transmutes his impressions into music. The artist or the poet, hearing the music, transmutes its motif into a painting or a poem that contains heart throbs for millions of his fellows.

The alchemists of old, with all their lore, failed because their efforts were made with the baser metals. They failed to realize that in life the finest material with which to work is man—his progress and his welfare. One good deed, a word or a smile, which tends to make man stronger, more responsive to human tenderness and human sympathy, is worth more than the centuries wasted in the effort to change dross into gold.

The Treatment of Pulmonary Tuberculosis by the Ultra-Violet Ray

W. B. CHAPMAN, M. D.
Carthage, Mo.

(Continued from the July issue)

I will report two cases of advanced pulmonary tuberculosis that were treated by the ultra-violet ray, both of which undoubtedly owe their lives to the use of this modality.

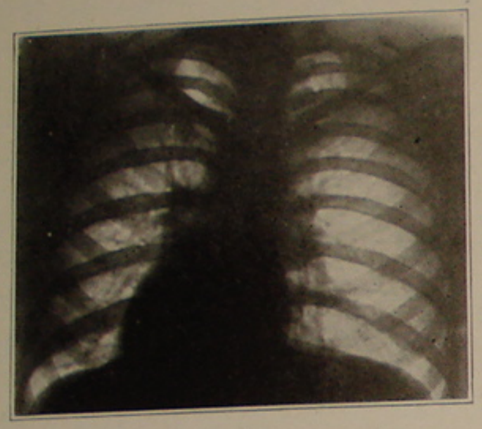
E. G. Female, blonde, age 24 years. Development of fifteen-year-old girl. Very weak and anemic. Had undergone three unsuccessful operations for tuberculosis fistulae during the past fifteen months. Examination revealed marked involvement of both apices. The old tuberculosis abscess on her right hip was discharging pus through two fistulous openings and was causing her a great deal of pain. The B. C. was 15,000, R. B. C. 4,000,000 and Hb 40 per cent. Her temperature ranged from 99 to 102 degrees Fahrenheit.

She was taken to the hospital, the tuberculosis fistulae were incised, curetted, swabbed with pure carbolic acid and packed loosely with gauze. At end of six weeks, patient left the hospital with the abscess and tuberculosis fistulae apparently well, and was placed on the usual cod-liver oil, rest, and open air treatment prescribed for sufferers from tuberculosis. At the end of about three months she was back with another fistula that opened into the old scar. This was merely incised and swabbed with iodine. It soon healed. Seven months later I was notified that she was not expected to live. She had been bedfast for six weeks and the old trouble was no better. I had her treated symptomatically until she could be moved here. Examination showed advanced tuberculosis in both lungs. She was very emaciated, and was expectorating profusely with an occasional small hermorrhage. The old fistula had opened and was draining again. She looked like a hopeless case.

Ultra-violet treatments were begun, using the aircooled lamp at a thirty-inch distance. The treatments were given daily, beginning with one minute the first day and increasing the exposure a minute each day until she was receiving ten minutes, front and back, at each treatment. We then maintained the time of exposure constant and shortened the distance one or two inches each day until the burner stood about fifteen inches above the body. Like most of these "T. B." sufferers, she showed extreme tolerance for the ray, and although she quickly became bronzed, she never became sunburned to the point of discomfort. (I explain this extreme tolerance of these patients to the ray as being due to the roughened, dry condition of their skin. The patients that have soft, vascular skins are the ones that burn quickly.) The ultra-violet treatments were preceded in each instance by radiating the body with the deep therapy lamp for twenty minutes over the chest and back. The distance of the lamp from the body was regulated according to the comfort of the patient, but the heat was made intensive enough to produce a flushing of the skin and a profuse perspiration. After four weeks of treatment, the patient ceased to have afternoon temperature, had gained in weight, and the appetite had improved. She continued the treatments for another thirty days, and then was sent home with instructions to return in four weeks for further treatment. On her return she was treated daily for a period of three weeks and then was dismissed clinically well. After six months she writes that she is in perfect health, has gained seventeen pounds since leaving the clinic here and is very grateful for all that we did for her. One point worth mentioning, is the fact that the tuberculous fistula healed rapidly during the ultra-violet treatments and has given her no more trouble.

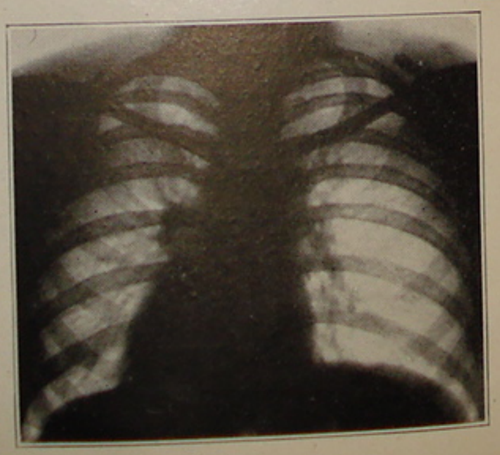
The other case that I wish to report is almost a parallel to the one just described. With this patient, however, the trouble was entirely pulmonary. When first presented for treatment, he was so sick that he had to be placed in the hospital for several weeks and treated symptomatically

before he could be brought to the clinic for ultra-violet treatments. Briefly, his case presented the following points of interest:



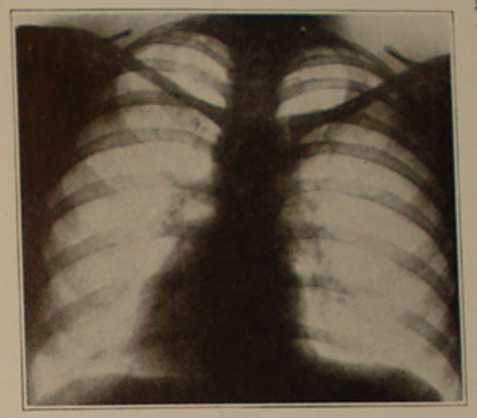
Before Treatment

W. D., boy, aged 15 years. Tall, anemic, hollow-chested. When presented for treatment, he was running a temperature of 104 degrees Fahrenheit, was coughing constantly and expectorating huge quantities of thick, creamy pus. He was too weak to stand and had to be placed in the hospital for several weeks before he could be brought to the clinic here for treatment. X-Ray examination showed almost complete involvement of the right lung with cavitation. There was also some involvement of the left upper. The patient was so toxic that we had difficulty in inducing him to take a little whiskey and other stimulants in sufficient quantity to maintain life. Operation for drainage of the rotton lung was suggested and abandoned as a hopeless procedure. His life was despaired of. At the end of two weeks, however, he began to take more nourishment, and we soon began bringing him to the clinic on warm days for ultra-violet treatments. Within less than a month he was able to make the trip himself on the street-car. His temperature was now normal most of the time, and the expectoration was not nearly so profuse. He continued the treatments for six weeks longer, during which time he gained rapidly in weight and strength. His father then took him to Arizona in the hope that the dry climate would prove more healthful than the changeable climate of



During Treatment

the Mississippi Valley. After four months he writes that the boy has continued to gain and is getting alone nicely. Since going to Arizona, I have continued to instruct them relative to sunshine, diet, rest, and general hygienic measures.



Case after 10 weeks

Sputum examinations of each of the above patients showed tubercle bacilli in abundance at the time of their entrance to the clinic. These decreased rapidly under the ultra-violet treatment.

I mention these cases simply because they illustrate what can be accomplished by the careful and persistent use of the ultra-violet ray. Both cases were considered hopeless by their attending physicians, and with the usual symptomatic treatment, would doubtless have died.

SUMMARY

1. The actinic or ultra-violet ray is not a specific for pulmonary tuberculosis, but is perhaps the most valuable contribution to the treatment of this dread disease that has been produced in recent years.

2. To treat this condition successfully, the physician must study each case separately, prescribe proper drugs, regulate the diet, assign certain hours for rest, instruct regarding exercise and general hygiene, and leave nothing undone that will help to restore the patient to health.

3. The treatments should not be given by an inexperienced technician, but by one that is trained in the use of the apparatus, in hygiene, and in the care of the sick.

4. When carefully and scientifically treated, as outlined above, we may confidently expect a clinical cure even in advanced cases of pulmonary tuberculosis.

Measured Wave Currents

By FREDERICK H. MORSE, M. D.

With an artist or a sculptor, work is successful according to the accuracy with which he reproduces or imitates Nature. Physiologists understand and biologists have accurately demonstrated that Nature provides in the vegetable and animal kingdom nourishment to maintain normal nutrition of the human body.

Enterprising pharmaceutical manipulators, as well as scientific pharmacists, attempt to arrange the seven essential elements that make up the structure of the body so that when one or more elements are deficient they can be supplied. There always has been and always will be discoveries of drugs and combinations of drugs to attempt to supply what may be needed to maintain normal nutrition or restore metabolism either general or local.

The more accurately the indications for determining what the insufficient element may be, the more definite and scientific is the medication that follows. And again, the more accurate the fruit or vegetable containing the necessary ingredient can be adapted to the requirements of the individual, the quicker will be the absorption of that essential element when taken from a vegetable instead of a medicinal source. In other words, from an organic origin versus an inorganic.

If the absorption of essential food ingredients is taken according to Nature's original plan sufficient to maintain and not over-strain the organism, and according to best physiological teachings, regular periods of ingestion, digestion, and absorption and a corresponding period of rest that Nature may recover itself from the possible exertion of the above metabolic process, other things being equal, man should live a hundred years.

Modern life, with its many deviations of maintaining existence all the way from unbalanced diet to ill-fitting garments and footwear, have so distorted the original plan that the old phrase of "three score and ten" too often closes the life performance with a practical cessation of mental and physical activity or actual demise with the majority.

The above summary of undisputable facts does not in any way help the sick, only as a warning that humans, like vegetation, are subject to decay and also that this degenerative process, barring accidents and acute diseases, comes sooner or later in some part of the body where something has happened to give it a start.

The disappointing effect of stimulants, the unreliability of medicine only as a palliative measure, behooves us to think seriously upon all means and methods to prolong existence by preventable measures. Life depends upon normal cell activity, and that cell activity varies greatly in different tissues and organs and should be recognized as the sine qua non in restoring functional activity; that point may be carried further by saying the underlying law of life itself originates and is perpetuated only through rhythmic impulses or vibrations.

The propriety of utilizing in medicine for restoring function by the use of many processes brought before the profession during the last twenty years should, if intelligently appreciated, be a means of prolonging existence and bringing more comfort to suffering individuals than the whole product of the century of discoveries previous.

Thermo-therapy and photo-therapy are dependent upon rays of varying magnitude. The X-ray for therapeutic applications because of its special virtues has deeper penetrating power. High frequency has in its vacuum and non-vacuum electrode applicators a localized form of heat, limited in its usefulness. Diathermy in its usual mode of application may be made to produce an immense amount of heat localized in diseased areas as desired. Static electricity with its most common and valuable form of application to and over diseased areas, under the usual name wave current, has a special virtue of its own because of its ability to liberate

near and distant toxaemia and other form of deleterious material. And last, but from a therapeutic point of view in the writer's opinion, the most important, the direct or commonly called galvanic current.

Wave current as may be applied from the different modalities mentioned may consist of any form of mechanism that will permit heat, light, electricity, or motion to manifest its beneficial action when applied to the body in a way that will synchronize as near as possible the well-known physiological action of that part.

If a galvanic current is applied through a portion of the body with moist surface electrodes, up to the point of easy toleration, in a short space of time the electrons and molecules will so arrange and re-arrange their positions that a current flow is actually established from the positive to the negative pole. If this current, for instance twenty-five milliamperes, is applied suddenly the skin resistance will be so great as to not only cause shock and pain but the contraction at first will actually retard the process of transmission as compared with the same amount of current having been allowed to be turned on gradually.

If the current is suddenly reversed unpleasant shock will follow, muscular spasm will ensue especially about the positive pole, and the process is much interfered with. This is specially demonstrated in the use of the so-called "sinusoidal" current, which is constantly reversing itself, and whether it is fast or slow, weak or strong, the same characteristic property is always present; and the one object to be looked for is frustrated by this current reversal.

The application of a powerful light, the thermo-penetration variety, brought suddenly to the body will have an unsalutary effect compared with its gradual approach. The same applies to high frequency applications, diathermy, static wave current, and even mechanical vibration.

(Cont'd on page 10)

Special Program for Our Monthly Physiotherapeutic Meeting

Monday, September 8, 1924

WM. E. HOWELL, M. D., associate of Dr. Plank, at the American Hospital, Chicago, will explain the "Ease and Effectiveness of Electro-coagulation Operations," *9:30 to 10:15 A.M.*

C. H. FREDERICKSON, M. D., of the Veteran's Bureau will talk on the "Advisability of Physiotherapy in General Practice," *10:15 to 11:00 A.M.*

R. F. ELMER, M. D., will conduct a very interesting clinic on the "Electro-coagulation of Tonsils." We will endeavor to have a number of cases on hand, that the actual work, as well as some results obtained, may be seen. *11:00 to 12 noon.*

The entire afternoon will be devoted to practical demonstrations on various pieces of Electrical apparatus.

How to Get Here:

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BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont; or

BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

We have ample space for all of you. Remember the date and come to our Lecture and Demonstrating Rooms at

2335 WABANSIA AVENUE

CHICAGO

We have heard from some physicians that Monday is a rather hard day to get away from the office, and that probably Wednesday or Thursday will be found more suitable. This is a vital matter, and we wish to obtain the opinions of a number that the best day of the month be selected. What is your opinion, doctor???

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The writer has seen in various mechanism the above modalities adapted to surging devices but only in rare instances has the principle been adopted, only as applies to synchronizing the alternating and uni-directional surging methods as applies to the selective motion surging wave generator.

A well-known manufacturer of light treatment devices, along the line of my thoughts and suggestions, is already arranging mechanism for the rhythmic measured application instead of the persistent steady glow as is usually understood.

Let us hope that this surging principle as applied to all Nature's functions, having a period of rest and a period of activity, on defective functional areas with forced activity will be more generally adopted.

462 Boylston Street,
Boston, Massachusetts.

Read before the Central Society of Physical Therapeutists, June 17, 1924.

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X-Ray Treatment of Lesions of the Thyroid Gland.
John G. Williams, M. D., Long Island M. J.

Goiters are classified as (1) simple, cystic, colloidal; (2) adenoma; (3) exophthalmic; (4) malignant. Adenomata with hyperthyroid symptoms, exophthalmics and malignant goiters are suitable for x-ray therapy. Rest and freedom from worry and excitement, together with medical treatment are essential concomitants of x-ray therapy. Cases not completely cured are better surgical risks after this form of treatment. Surgery is indicated in malignant disease of the thyroid whenever complete removal of the growth is possible and if inoperable the case should be treated by x-ray as this will probably relieve the symptoms and may possibly cure the disease. If symptoms persist other surgery than x-ray therapy should be used.

Ultra-Violet Ray Therapy in Dermatology

JACK W. JONES
Southern, M. J., 16: 423

In dermatology the therapeutic value of the ultraviolet rays depends upon the bacteriologic and stimulative action. The action of the rays upon the skin is manifested symptomatically by an erythema of the part exposed. Thus, a stimulative erythema, a regenerative erythema or a destructive erythema can be obtained, depending upon the length of exposure. Scalp conditions, particularly seborrheic dermatitis or alopecia premature from seborrhea, alopecia areata and psoriasis, seems to react very favorably to ultraviolet rays. In lupus erythematosus, particularly of the chronic discoid type, the ultraviolet rays give promising results, but here again, as in alopecia areata, the primary focus (whether tuberculous or otherwise) must receive attention. In the treatment of adenom asebaceum the rays are about the only agent upon which much dependence can be placed, and the same might be said in regard to the chronic sluggish ulceration caused by trauma or infection, in which epithelium seemingly refuses to grow. The literature contains reports of successful results following ultraviolet-ray treatment of nevus flammens and parapsoriasis.

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Suction Tonsillectomy

For those of our readers who have apparatus with Suction attachment we refer to a very interesting article on suction as aid to tonsillectomy by J. E. Braunstein, M. D. in the Eye, Ear, Nose and Throat Monthly for March, 1924. The various instruments illustrated are best used in connection with Fischer Cabinets equipped with the Motor with Vacuum and Pressure Pump. We will be glad to tell those who may be interested more about this technic.

Quartz Light Therapy

By LEO C. DONNELLY, M. D.
607 Kresge Building, Detroit, Michigan

Generally speaking, an infected, ingrown nail should be completely cured in four or five days when promptly treated by surgical measures and the proper use of ultra violet rays, both before and after such procedure.

Actual treatment begins by the removal of scabs and pus, followed by a first-degree reaction procured by a treatment of short duration with the Quartz lamp. This sterilizes surrounding tissue, causing at the same time a flushing of superficial blood-vessels, thereby warding off the spread of infection.

We then use a third-degree reaction on the area of infection where the nail is to be removed, with consequent sterilization of the field of operation and a material lessening of pain sensibility as well. After removal of the usual V-shaped portion of nail and infected tissue, a further second-degree Ultra Violet Ray reaction is given to the resulting wound, inducing haemotasis, insuring prompt healing without infection, and thereby giving much quicker and more satisfactory results than otherwise could be anticipated.

* * * *

Where infection is evidenced between the toes, often at the base of soft corns, there, again, Quartz lamp treatment is indicated in order to secure the most favorable results. The attendant abscess is generally deeply seated—dorsum of foot swollen and sensitive.

The entire foot and lower leg is given a first-degree Ultra Violet Ray reaction with the Alpine Sun Lamp before making an incision into the abscess. After the incision is made and proper drainage secured, the Kromayer lamp is used, passing a suitable Quartz applicator into the incised opening, with the purpose of sterilizing all portions of the abscess base. Following this procedure, markedly reparative changes are manifest.

The Exhibit of H. G. Fischer & Co., Inc.



The Exhibit of Physiotherapeutic Apparatus at the American Medical Association Convention, on the Municipal Pier, Chicago, June 9th to 14th, 1924.

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Electric Coagulation or Endothermy. We have for years used fulguration in attacking papillomata through our open air cystoscope with the patient in the knee-chest posture, but have always found that the chief difficulty was that we were able to make so little impression on a massive tumor at one sitting, even though we attacked the pedicle. Fulguration seems to yield its best results in sparking out superficial flat areas of disease where the papillary tumor is disseminated. In papillary carcinomata with infiltration, it is of course worse than useless. It is not our desire, however, to deprecate an agent which in a limited field has proven such an advance over previous ineffective methods.

The Fischer "Diathermo Indicator"

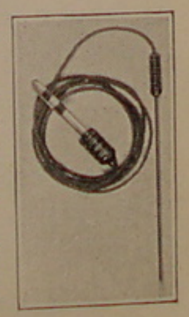
It is with extreme pleasure that we announce the perfection of a method whereby physicians may know exactly at what degree of temperature they are treating, when employing Diathermy.



Suggestions and requests have come in steadily, in reference to some device that would indicate with extreme exactness just what heat was being produced within the tissues, and so much importance was placed back of this apparent necessity, that we set our engineers to the task without delay.

The obstacles to be overcome were numerous; we were not to employ neither mercury nor glass; the instrument must be small enough that it could be passed through a cystoscope; it must be very sensitive, and record small temperature changes immediately; and above all it was absolutely necessary that the instrument be used in rooms of varying temperatures and still retain a reading that could be pronounced standard. And, furthermore the readings must not be affected in any way by any voltage or volume of High Frequency Current which may be applied to the patient.

We have produced a little instrument which is simplicity in the extreme, conforms to all the requirements, and combines exactness beyond our fondest expectations. The sensitive unit is enclosed in a silver tube of 1/8 inch diameter, and but the slightest change in warmth immediately causes a deflection of the galvanometer needle. By an ingenious method of combining a compensating lead wire, and by the adoption of the well known Wheatstone Zero Method, the dial of the instrument can be set at the desired temperature, and the physician, by



increasing or decreasing his Diathermy Current merely causes the needle to reach the Zero point—indicating that he has reached exactly the degree of heat desired.

Physicians are fast learning that they can reproduce results provided they can duplicate the amount of given heat for a certain length of time, and with this new instrument an assured fact we look forward to tremendous strides in Diathermy accomplishments in the near future. The little instrument, which we are calling the Fischer "Diathermo Indicator," and its use will prove an innovation in the art of applying Diathermy, and the problem is now passed directly back to the physician—it will be up to him to register his readings, and to prove beyond a shadow of doubt that duplication of results is easily possible.

Some of these instruments are already out in the field, and shortly many more will be placed in the hands of well known authorities throughout the country, and Fischer's Magazine will keep you in touch with progress made.

The Fischer "Diathermo Indicator," complete with two units will list at $100.00. Deliveries in about 30 days.

Physiotherapeutic Lecture Course

By MEL R. WAGGONER, M. D.
Cedar Rapids, Iowa

To be given at

DETROIT, MICHIGAN, HOTEL WOLVERINE

August 25th to 30th

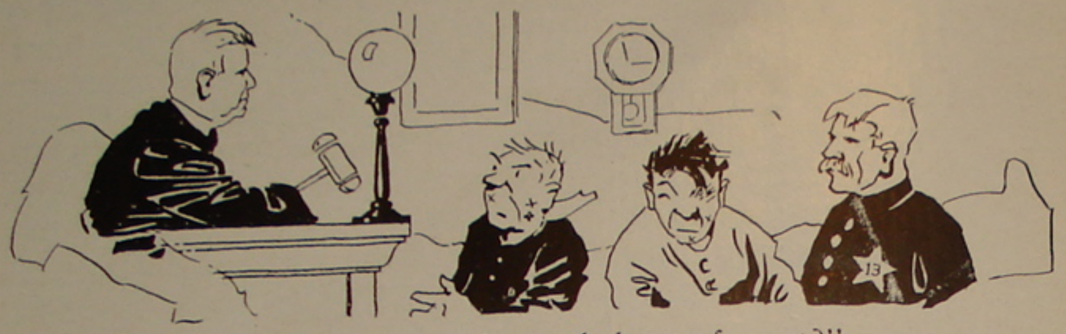
PERSONALLY CONDUCTED COURSES—CLINICS—LECTURES

For Details, Fee, etc., write

MEL R. WAGGONER, M.D., Cedar Rapids, Iowa

Courses will also be given subsequently at Milwaukee, Wis., Chicago, Ill., and New York, N. Y.

A PAGE OF FUN



Magistrate: "Can't this case be settled out of court?"
Mulligan: "Sure, sure; that's what we were trying to do, your honor, when the police interfered with us."

□ □ □

"Did Charles kiss you last night, Penelope?" asked a Boston mother.

"There was a slight labial juxtaposition as Charles departed, mother dear; but I assure you it was only momentary and therefore innocuous."

□ □ □

They were motoring. The talk ran to a discussion on vaccination. He thought vaccination on the arm the proper thing; on the other hand, she stated most emphatically that she didn't let the doctor vaccinate her where the scar would always show. To prove his contention, he rolled up his sleeve and showed that the scar had almost become invisible.

She then inquired: "Would you like to see where I was vaccinated?"

He eagerly replied: "Yes, indeed."

"Well," said she, "keep your eyes open; we'll drive by there pretty soon."

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She: "You know, dear, our guild has been trying to think of a way to help that poor Mrs. Smith, who is too proud to accept money?"

He: "Yes, darling."

She: "Well, today I thought of a lovely plan, and I mailed a check right out to her."

He: "How did you manage it?"

She: "Why, I simply wrote the poor woman a check and signed it 'Anonymous'."

□ □ □

Doctor: "And how is Mr. Sikes this morning? Has he had any lucid intervals?"

Mrs. Sikes: "No, doctor, he hasn't had a thing but what you ordered."

□ □ □

Student: "And poor Harry was killed by a revolving crane."

Englishwoman: "My word! What fierce birds you have in America."

IT is the quiet worker that succeeds. No one can do his best, or even do well, in the midst of badinage or worry or nagging. Therefore, if you work, work as cheerily as you can. If you do not work, do not put even a straw in the way of others. There are rocks and pebbles and holes and plenty of obstructions. It is the pleasant word, the hearty word, that helps.

See Pages
8 and 9

for further announcement
of the

Annual Fall
Physiotherapeutic
Convention

at

Chicago

FISCHER'S MAGAZINE



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H. G. FISCHER & CO., Inc.

360

SEPTEMBER, 1924

BE PLEASANT.

YOU HAVE NOT FULFILLED EVERY DUTY UNLESS YOU HAVE FULFILLED THAT OF BEING PLEASANT.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II SEPTEMBER, 1924 No. 10

OUR MONTHLY "MONDAY" PHYSIOTHERAPY MEETING has been CANCELLED for the month of OCTOBER because of the close proximity of our **ANNUAL FALL CONVENTION**—the dates of which have been definitely set for the week of October 20th to 24th, 1924, and the place, the Logan Square Masonic Temple, at Logan Square, Chicago. **See page 8 and 9 this issue for further details.**

Just a brief comment on our meeting of Monday, August 11th—we had only one clinician, Mel R. Waggoner, M. D., of Cedar Rapids, Iowa—and over a hundred and fifty physicians to entertain—but our speaker of the day proved himself more than equal to the task!

YOU probably attended; but for those who did not have the opportunity, we must say that splendid enthusiasm was constantly in evidence. There were 32 patients to handle—Dr. Waggoner treated every one, and on direct questioning most of the patients were quite agreed that the methods employed were both painless and effective. Dr. Waggoner will be invited to address our audience again in the near future; watch for announcements in this publication.

(All of the correspondence relative to Physiotherapeutic subjects is not of the most agreeable nature, as is evidenced by the two following letters. The first is copy of letter received by one of our distributors, and the second is their response thereto. The writer of the first letter is very skeptical, but he is just the type who, when he has a more thorough understanding of electricity in medicine becomes a very ardent booster.) THE EDITOR

_____, ____.

_____, July 18, 1924.

_____, ____.

Gentlemen:

Answering your letter of the 10th inst., allow me to remark that the medical literature giving reports of successful treatments with Diathermy are doubtless numerous and interesting, but do you ever get the other kind? While writing these letters do you ever pause to think of the wonders of Diathermy? E. G. "In cancerous conditions and vascular tumors it seals the blood and lymph channels" and yet it dilates those same vessels in Arteriosclerosis? What a wonderful machine, or in other words "Ain't Nature Wonderful?"

Yes, I had a patient on whom the great Dr. ———— operated for many long weeks in the ———— Hospital. The patient had Gangrene from Arteriosclerosis and was doubly assured by the celebrated Dr. ———— that the leg would be saved. Well it was saved until my patient nearly died from exhaustion, but common sense finally prevailed and the leg was amputated.

No this isn't all. The other leg was treated as a prophylaxis against a similar fate and on his return to ———— he was treated several weeks more with Diathermy. This was about a year ago and at present the patient is suffering from all the symptoms of on-coming "Gangrene" and looks forward to another amputated leg before many months.

Yes, I agree with you. It has (in the hands of unscrupulous men) vast financial possibilities. I have seen this fact demonstrated to my entire satisfaction.

Well I guess this will be all for today. This letter is really a "Testimonial," but of course you needn't feel compelled to publish it unless you really feel that you must. Electricity is possibly of some use in selected cases, but if there is anything under Heaven "faked" as much, then I haven't heard of it.

Very truly yours,

_____, M.D.

Dr. ———— ————,

————, ————.

July 26th, 1924.

Dear Doctor ————:

Replying to your somewhat effusive commentary on Diathermy, which no doubt was prompted by the fact that one of our circular letters came to your office, permit me to say that I agree with you, "Nature is wonderful;" but strange and baffling as she may seem, she is no less interesting than some of her products, E. G. some physicians I have known. While for many years our sole business has been dealing with doctors, yet every now and then we see new and strange things happening. For instance a physician who is presumed to be an educated man, expressing opinions concerning things with which he has had no experience or knows nothing about, as freely as the uneducated bigot who sits whittling on a soap box in a cross road country store down in the Ozarks, with an opinion for every question that reaches his ears, no matter what the nature of the question may be—political, sociological, scientific or what not, again we remark, "Ain't Nature wonderful."

Our old friend "Bill" Shakespeare said many years ago that "a little learning is a dangerous thing," and this we see exemplified over and over again. And it would seem that some of our doctors at times, feeling the urge of expounding some mighty truths concerning Diathermy, testify to the correctness of "Old Bill's" statement. For it is a fact, Doctor, if the statements contained in your letter are to be taken as an index of your knowledge of Diathermy you would pass with a grade of zero plus, because you know how to spell the word and that is all.

No one recognizes the paucity of knowledge among the rank and file of the medical profession with reference to some of these new modalities better than we, yet some of the biggest men in the profession have taken up this line of work and are beginning to write books and reporting results through the medium of the leading medical journals. So, Doctor, if you feel constrained to comment further on some of these newer phases of medicine, permit me to suggest the perusal of some of the newer medical books, or any of the leading medical journals.

For your information, I may say that a school will be conducted in ————, one day each month, starting in September, for the benefit of physicians interested in this kind of work. If you are really interested we shall be glad to advise you further in this regard.

Further, let me say we always welcome criticism, knowing that it will not all be favorable or constructive, yet if it comes from someone with experience, or one who knows, it is gratefully received.

If we can be of help in furthering your knowledge along these lines, we stand ready to serve you.

Sincerely,

_____

Electro-Coagulation of Hemorrhoids

J. B. H. Waring, in the Virginia Medical Monthly, presents the following treatment of hemorrhoids:

Operation is performed under local anesthesia. About three-quarters of an hour prior to operation, morphin sulphate, grains 1/4 to 1/3, is given by mouth, together with atropine sulphate, grains 1/100, and strychnin sulphate, grains 1/30. This may be given by hypo if desired.

Bowels should have been emptied prior to operation, preferably by a simple enema or glycerin suppository. Operative field is now cleansed with mild soap and water, followed by irrigation with a weak potassium permanganate solution, say 1 to 3,000 or 1 to 5,000; this largely eliminates fecal odor for the time being, and renders field more satisfactory to work in from an olfactory standpoint anyway.

An appropriate spot of rectal mucosa is swabbed with 10 per cent cocain and through this preliminarily anesthetized area, the entire operative field is successively anesthetized in a practically painless method by successive injections of 1 or 2 per cent novocain solution. If a glass suction cup of sufficient size to cover the anus is now applied, internal piles will be drawn down and temporarily converted into interno-external piles; likewise, all pile masses will be congested up and made prominent to inspection, so that the operator is not so likely to miss a budding pile or two, and have his patient return in six months after operation with the lament that his piles are coming back on him, etc. Individual pile masses may now be taken up one by one and held in the grasp of an appropriate sized suction tube of glass; or they may be drawn out with seizing forceps, and then held across their base with a regular pile clamp, merely for convenience of attack. The suction tube holds the hemorrhoid out prominently, and serves the purpose of a steadying forceps, without the crushing and lacerating effect of a pile clamp.

An electro-coagulation needle in an insulated handle is now brought into play, using the bipolar d'Arsonval high-frequency electric current directly on the pile mass. The indifferent electrode, usually about a 5 or 6 inch plate of diathermy metal, is strapped over one leg or over the shoulder or abdomen, care being taken to have good contact by means of a cloth wrung out of saline, damp felt or special electrode metal with soapsuds for better contact or patient may grasp the regular auto-condensation handle instead.

The electro-coagulation needle in an insulated handle is now connected by flexible insulated wiring to active pole, and the needle carried through base of hemorrhoid under edges of suction tube holding pile out prominently. With foot-switch usage, just enough current is sent through the needle to coagulate, but not to carbonize or burn hemorrhoidal tissues; this process is repeated with several injections of the needle until a layer of tissue at base of pile proper is entirely coagulated, thus destroying blood and lymphatic supply to the pile proper. A little experience will quickly determine for the operator just about the right amount of current to employ.

If there are, as is usually the case several pile masses to be removed, each successive pile is taken up and treated in the same manner; only a few minutes is required for the entire procedure. If care is taken to handle the pile masses gently and proper anesthesia obtained, the entire operation is painless. The tissues at base of each pile are simply coagulated in a manner similar to the poaching of an egg. Pain following the operation would be indicative of some sparking and some degree of carbonization on the active electrode, which is to be avoided.

This completes the operation proper; we have strangulated each pile mass far more effectively than if we had the stoutest ligature encircling its base, and this has been accomplished without any pain, bleeding or use of the knife; no raw surfaces have been left to cause the pain, which follows

the usual surgical treatment of piles. Coagulation of its base destroys blood and lymphatic supply of the pile mass, and in a few days this sloughs away in a painless and bloodless manner, skin and rectal mucosa involved healing over the operated area very rapidly. Our patient has not been subjected to hospitalization, with its attendant fright to the average patient; he is not upset and miserable in mind and body after reaction from a general anesthetic; further, he is not troubled to any extent with irritation around the anus. The treatment is admirably an office procedure, and at its conclusion our patient is ambulant, and able to go home under his own steam as it were. Nervous or weakly patients are instructed to take it easy for a day or two; one old lady of 80 summers, I kept in bed for three days; but most of them are up and about in short order.

We do not have to make any radical change in the patient's dietary, but instruct him to eat a trifle less for a few days until full activity is restored. Liquid petrolatum, or preferably petrolagar, in full dosage for a few days, is very helpful in rendering the bowel passages bland and easy; our patients do not dread the first bowel passage after operation; this gives them practically no discomfort, and we have the bowels move the next morning as usual. This is radically different from major surgical attack on hemorrhoids, where often the bowels are purposely restrained for "healing" purposes; and after a number of days the first bowel action is usually looked upon as a formidable adventure, fortified by large dosage of oleum ricini.

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To the Readers of FISCHER'S MAGAZINE:

Those of us who are convinced that physiotherapy is of real value in the practice of medicine, deplore the fact that there are so many prominent men in our profession who are skeptical or cynical, or even sarcastic about physiotherapy.

Some of the big men to whom we look up as authorities are still prone to consider the work somewhat in the light of quackery. Men who are well established in medicine look askance our apparatus and our claims for what it will do. We know that it is because they have not yet been sufficiently informed; we are sure that if they once gave it a fair trail, they would be with us. But, they won't listen when we talk to them.

These very same fellows, when insulin came out, accepted it instantly and implicitly. Why the difference? The whole thing hangs on the source from which they got their information. The announcements of insulin first appeared in the classical media of medical literature. It was a scientific news item first of all.

But, just because a large amount of the information on physiotherapy is being disseminated by the manufacturers in their own private literature, many of our conservative colleagues assume *ipso facto* (as I did before I became convinced by several years of personal study) that the whole business is a commercial scheme, and therefore valueless.

The facts in the matter are, that a large amount of careful scientific work has been done on physiotherapeutic subjects. But, the general run of medical men does not know of it, because the reports of it have not appeared in the current medical literature. There is a certain set of medical periodicals which are accepted as gospel by the great mass of medical men.

Physiotherapy is the most fertile field today, for original clinical observation. The editors of this same class of classical medical journals will be only too glad to get such material from any of us, if the observations are accurate, and the papers are scientifically worked up. The work would not even have to be new; a series of cases confirming or disproving the effect of autocondensation on blood pressure or of quartz light on carbuncles—accurate, logical, conserva-

(Cont'd on page 10)

SPECIAL ANNOUNCEMENT!

Annual Physiotherapeutic Meeting

At Chicago, Illinois

October 20th to 24th, 1924

The Convention of Physiotherapeutists at the Logan Square Masonic Temple, Chicago, last fall was heralded as such a decided success that it has been decided to make this an annual affair.

These meetings, where all manner of subjects pertaining to Physiotherapy may be discussed openly and informally, are the direct result of numerous requests, due to the difficulty experienced by physicians in obtaining practical information from reliable sources in the efficient application of these measures.

The following physicians of note will participate:

E. C. Henry, M. D., Omaha, Nebraska, *Chairman*
Miles J. Breuer, M. D., Lincoln, Nebraska
W. B. Chapman, M. D., Carthage, Missouri
Wm. L. Clark, M. D., Philadelphia, Pa.
Maurice H. Cottle, M. D., Chicago, Ill.
Leo C. Donnelly, M. D., Detroit, Michigan
Emile C. Du Val, M. D., Chicago, Illinois
R. F. Elmer, M. D., Chicago, Illinois
Chas. H. Fredrickson, M. D., Chicago, Illinois
Dean W. Harman, M. D., Ames, Iowa
Abraham R. Hollender, M. D., Chicago, Illinois
Wm. E. Howell, M. D., Chicago, Illinois
D. Frank Knotts, M. D., Chicago, Illinois
Disraeli W. Kobak, M. D., Chicago, Illinois
Gustav Kolischer, M. D., Chicago, Illinois
Arthur La Roe, M. D., Newark, New Jersey

Ellis G. Linn, M. D., Des Moines, Iowa
Frederick H. Morse, M. D., Boston, Mass.
Roswell T. Pettit, M. D., Ottawa, Illinois
Curran Pope, M. D., Louisville, Kentucky
A. L. Smith, M. D., Corry, Pennsylvania
Harry M. Thometz, M. D., Chicago, Illinois
Norman E. Titus, M. D., New York, N. Y.
Albert F. Tyler, M. D., Omaha, Nebraska, and
Mel. R. Waggoner, M. D., Cedar Rapids, Iowa.

Several other physicians skilled in physiotherapy have promised to be present and to lend their assistance. These meetings will be open to all physicians of standing. There will be no charges, and no obligation incurred by attending.

The complete program, which will appear in these pages in a subsequent issue, has been arranged with but one object in view—to promote greater efficiency in this work, and the entire proceeding will be strictly informal; allowing the greatest freedom for questions and answers.

THE DATES—OCTOBER 20th to 24th, 1924—Inclusive

THE PLACE — THE LOGAN SQUARE MASONIC TEMPLE, at the terminus of the Logan Square Metropolitan Elevated Line, CHICAGO, ILL.

It is earnestly requested that registration be made at once. While Auditorium facilities are almost unlimited, certain preparations must depend upon the number in attendance. This meeting to be held under the auspices of

H. G. FISCHER & COMPANY, Inc.
Address the Secretary of Arrangements at
2333-43 Wabansia Ave., Chicago, for further details.

tive, scientific—would be gladly accepted. And, among the ranks of workers in physiotherapy, there must be plenty of men who are capable of making such observations and writing them up. What is wanted in this field, is not enthusiasm, but systematic work and rigid reasoning.

A few such articles from time to time, appearing in our State and District Medical Society publications, would very quickly attract the attention of the medical world to physiotherapy, and change the tone of its voice in speaking of this work. And, until systematic and accurate clinical observation begins to be reported in reputable current medical literature, physiotherapy will always be a cinderella.

Let us all get to work, we who are convinced of the value of these methods, and discuss them in our favorite medical journals and meetings, with the same scientific attitude that we hold toward the rest of medical knowledge.

Respectfully,

MILES J. BREUER, M. D.
LINCOLN, NEB.

Treatment of Paralyzed Muscles in Hemiplegia

(The following, from F. H. Morse, M.D., of Boston, Mass., is his reply to a letter received by us from one of our Magazine readers.)

Dear Doctor:

"I received a letter from H. G. Fischer & Co. of Chicago, asking me to write to you direct about the treatment of paralyzed muscles in hemiplegia. I am receiving many similar letters from doctors all over the country and it makes me wish I had more time to quickly finish my book on 'Galvanism and Wave Currents.' However, that is in the future.

"The treatment following hemiplegia resolves itself into maintaining the highest degree of nutrition over the paralyzed areas, and at the same time maintaining sufficient passive muscle exercise to prevent atrophy and functional inactivity. The book, 'The Therapeutics of the Morse Wave Generator,' which you have, will give you the information on the treatment of paralysis in general, but which might not apply to the case in question.

"The average case where nature is making an attempt at restoration by showing some improvement in muscle movements, use a mild current of galvanism; if the arm to be treated, one electrode at the occiput (positive) and the negative on the wrist using Cam No. 1, resistance three, 3 to 5 M. A. In about ten minutes the arm will have become warm from the passage of the current, and in a better condition for exercise. Leave the wrist electrode in place and put one electrode (about 4x5 inches) in the upper dorsal region, using Cam No. 2 on the alternating current up to the point of reasonable toleration. Exercise not over five minutes for fear of local exhaustion. A similar procedure can be used down the paralyzed leg from the lumbar nerve to the ankle by using, possibly, Cam No. 6, 7 or 8 for the exercise part on the A. C. This would be routine technic in the average case, all of which may be varied according to existing conditions."

The Treatment of Pyorrhea Alveolaris

(The following letter was written by W. B. Chapman, M.D. of Carthage, Mo., in response to an inquiry from one of our good customers.)

Dear Doctor:

"I have your inquiry addressed to H. G. Fischer & Co., relative to the treatment of pyorrhea alveolaris by Diathermy. As advised by Mr. H. T. Fischer, the location and nature of the disease is such that it cannot be treated to advantage by Diathermy. However, pyorrhea alveolaris is greatly benefitted by actino-therapy, and where the gums have not receded too greatly, the condition can be cured.

"The technic is as follows:

"Remove all tartar, fragments of food, etc., from the teeth, passing silk between them, and rinsing the teeth and gums thoroughly before beginning treatment. All abscessed teeth, crowns, roots, and other sources of infection must be removed.

"Charge the water-cooled quartz lamp and allow it to run for five minutes before beginning treatment. The water should be turned on so that it flows steadily, but without force, through the lamp. Never allow it to flow with enough force to raise a column of water more than one-inch above the end of the drain.

"Using a straight quartz glass tooth applicator treat all diseased areas on the gums in front of the teeth allowing the ray to penetrate between the teeth. Give from one to two minutes to each spot. More than two minutes will irritate the gums and make the condition worse. After all of the diseased areas in front of the teeth have been treated, take the

bent quartz tooth applicator and treat the gums behind the teeth in the same manner. It is better to treat the gums every day using a one-minute time exposure than to give a more severe treatment with longer intervals in between.

"The patient should be given minute instructions regarding the care of the teeth, and should use a very mild toothpaste and a soft brush. Too vigorous rubbing with a stiff brush tends to break down the peridental membrane and encourage the spread of the infection. As a mouth wash, I recommend ordinary salt water."

Very truly yours,

Auto-Condensation Treatment

(Here is another splendid contribution from our good friend, Dr. W. B. Chapman, also written in answer to inquiry direct to us, and which we felt should be answered from a medical source.)

Dear Doctor:

"I have your inquiry directed to H. G. Fischer & Company of Chicago, relative to auto-condensation treatments, etc. I find that Mr. Fischer has answered all of the questions very fully with the exception of the cause of the oppression observed by patients after auto-condensation treatments wherein the plate was applied directly over the precordium.

"The heat energy that is generated within the tissues of the body due to the very rapid transmission of electrical impulses through same, stimulates automatically the vaso-dilator nerve endings within the walls of the smaller blood vessels. This is what causes the fall in blood pressure that is observed during such treatments.

"In applying the smaller electrode directly over the precordium, you concentrate a great deal of electrical energy within a small area that contains the cardiac plexus which is rich in vaso-dilator nerve fibres. These nerve fibres are distributed to the heart, and other highly vascular organs, and when stimulated, cause an immediate congestion of the splanchnic region with a consequent fall in blood pressure. This disturbance to the cardiac plexus is transmitted automatically to the gaval system and sets up similar reactions within the brain so that a feeling of lassitude or oppression results. I can explain this reaction in detail but it would take too long. I will say, however, that the reaction is not without danger, and I seldom apply the plate electrode above the heart except in strong robust patients, and then I watch them very carefully. I have had a few patients break out in a profuse sweat and require cardiac stimulation where this treatment was carried out too vigorously".

DIATHERMY IN INTERNAL MEDICINE

In an article entitled "Diathermy in Internal Medicine" published in The Journal of the American Medical Association, July 26, 1924, p. 266, Edward W. Jackson, M. D., Rochester, N. Y., says that many persons complain of heart pains. He believes that a large percentage of these pains are diagnosed erroneously as angina pectoris. His examination frequently discloses the cause of the pains to be a neuralgia or myalgia of the chest wall. The slow and often unsatisfactory results obtained in treating these conditions with rest, medicines, conductive and convective heat, and other time-honored remedies, led Jackson to investigate diathermy, the only method he knows of whereby it is possible to apply physiologic heat to tissues beneath the surface. Jackson emphasizes the fact that a proper technic is as important in diathermy as in any other therapeutic measure. In fact a better judgment and a broader general knowledge of medicine are required in the proper application of diathermy and in the selection of cases for treatment, than in most other therapeutic measures.

In all, 1,470 treatments were given by Jackson to sixty-one patients, divided among the various body systems as follows: circulatory, 526; nervous, 266; respiratory, 54; joints, 352; muscular, 223, and urogenital, 39. Full use of the various diagnostic measures was made in the study of these patients. When found, foci of infection were removed, but diathermy was not withheld pending a clearing up of the foci of infection. This, Jackson says, is important, since during the treatment prompt relief was obtained in many painful conditions, thereby proving diathermy of diagnostic value, and lastly, when successful, of economic value in curtailing further diagnostic and therapeutic expense. Thirteen selected hypertensive patients, who had been under Jackson's care for three or more years, agreed to cooperate for the purpose of investigation for more than one year. The treatment for a year or more had been a simple general diet; rest, including a midday rest period, and care in

avoiding emotional disturbances; good elimination, and hygiene. During this period of what Jackson terms rational treatment, the patients had been seen every month or two and the blood pressures had averaged remarkably uniform for each case.

The types into which these cases fall are: (1) climacteric, five; (2) essential hypertension, three; (3) nephritic, three, and (4) arteriosclerotic, two cases. To avoid unfavorable emotional and physical disturbances, these patients were treated in a quiet, darkened room; tight clothing was loosened and they reclined comfortably on the dielectric pad. The office type Tycos instrument was used, the sleeve being left in situ during the treatment. Before starting the treatment, blood pressures were taken at intervals of from one to three minutes until no further lowering was recorded. This usually required from five to ten minutes. The treatment was then given. Until the final pressure reading was made, every precaution was taken, so that the patient was not disturbed. The d'Arsonval circuit was used.

The length of treatments varied from one-half to one hour, mostly the latter; the frequency of treatments varied from one to five weekly. Jackson found that too prolonged treatments with high milliamperage were weakening. Under ideal conditions of the application of diathermy to reduce hypertension, the patient should rest in bed for several hours directly after treatment. The retention of the heat in the body tissues would thus be aided and its physiologic action prolonged and augmented. Jackson's investigation had now been carried on for more than a year. It had been determined that, with careful attention to details, diathermy would reduce arterial hypertension, and, as long as the treatments were continued, would keep the pressures within safer limits.

Properly applied, the treatments were time consuming and harassing. Therefore, Jackson entered into anagreement with eight of these patients, whose home con-

veniences were such that sedative baths could be taken at their pleasure, to compare the action of baths with his records of diathermy in reducing their pressures. The physiologic effects of such a bath, under the prescribed conditions, followed by noctural bed rest for from eight to twelve hours, were superior to other methods of hydrotherapy in the treatment of hypertension.

Invariably the reduction of pressures following these baths compared favorably with diathermy. Restlessness, insomnia and weakness followed over-treatment, as with diathermy, and it was necessary to adjust the frequency and duration of the baths and to caution that the proper temperature of the water be observed. In time, these baths prove irksome and are likely to be indifferently performed by the average patient. Even with this selected group, frequent observation and evidence of the physician's deep interest were necessary to encourage them. There is a minimum to which any given case of compensatory hypertension may be reduced without provoking symptoms and signs of circulatory failure. As long as the fall of the pressures is unaccompanied by circulatory or nervous discomfort, whatever the method used, it is safe to proceed cautiously with attempts to lower them.

Baths and diathermy, singly, or when wisely combined and adjusted to fit the particular patient, are equally efficient in reducing hypertension. This reduction persists as long as the treatments are continued, provided the other important factors—rest, diet and hygiene—are faithfully observed. When baths and diathermy are stopped or indifferently performed, the pressures gradually creep up. A proper application of diathermy is but half the treatment; the other half is the after-care. Five patients with organic angina, all men in late middle life with a chief complaint of substernal pain, believe that diathermy has been of definite value to them, their attacks being less frequent and severe. Jackson is convinced that the symptomatic relief obtained has justified its use. If complete relief

is not obtained from diathermy, a source of infection must be located elsewhere in the body and removed. The results obtained from 1,470 applications of diathermy to sixty-one patients suffering from various conditions common in internal medicine have convinced Jackson that diathermy is of value for the reduction of arterial hypertension, but sedative baths under carefully prescribed conditions are equally helpful. Diathermy has given symptomatic relief in many painful conditions more promptly than was obtained under usual treatment, and it is an addition to other therapeutic resources Jackson recommends that diathermy be studied in hospitals and large clinics to define its scope, indications and limitations.

Blind Radioist Recovers Sight While at His Set

SYDNEY, N. S., July 24.—Hugh Roper, 87, totally blind, experienced an almost complete recovery of his sight for a period of 48 hours as a result of electrical vibrations received while listening in on a radio concert.

On the morning following, Mr. Roper was able to distinguish the hour of day on a small clock placed some distance away.

□ □ □

Physiotherapeutic Lectures at Omaha

A splendid program has been arranged for October 6th, 1924, in the Lecture Hall, 1118 Farnam Street, Omaha, Nebr. The speakers of the day will be:

B. B. Grover, M.D., Colorado Springs, Colo.,
Disraeli W. Kobak, M.D., Chicago, Ill.,
R. W. Fouts, M.D., Omaha, Nebr.,
G. A. Fleischman, M.D., Des Moines, Iowa,
Norman C. Prince, M.D., Omaha, Nebr.,
M. Wood, M.D., Tekamah, Nebr.,
W. L. Ross, Sr., M.D., Omaha, Nebr., and
W. D. Chessney, M.D., Milton, Wis.

This meeting will be followed with a banquet and a very interesting evening session.

All physicians are invited to attend; no cost, no obligation.

The Role of Physiotherapy in Low Back Conditions

By FRANK B. GRANGER, M.D.
Boston, Mass.

That the diagnosis and treatment of disabilities of the low back type is unsatisfactory, goes without saying. You have had excellent papers on their etiology and pathology, yet in many cases the diagnosis is difficult to make and consequently to institute the proper treatment is still more perplexing.

In traumas of the back the victim usually falls into the hands of one or more of the following classes:

1. The casual treatment of the casual physician where chloroform linament and a few strips of adhesive suffice, whether the pathology be a crushed vertebrae, hypertrophic spine, ligament or muscle injury.

2. The osteopath or chiropractor who in a few cases succeed, but who in many others increase the disability and perhaps add their share to the existing trauma.

3. The orthopedist whose idea of support, rest and fixation are good and who links the X-ray with careful physical examination, but who in some cases is obsessed with the idea of rest and fixation to such a degree that atrophy and loss of muscle tone markedly retards recovery.

4. The physiotherapist who, too frequently, knows little and cares less for proper fixation and rest and who attempts often with success to relieve muscle spasm, to produce an active hyperemia, with consequent tissue drainage, but who also at times unduly stimulates structures needing for a short time rest and sedation.

It is evident, therefore, that success in treatment depends on: first, a careful and correct diagnosis; second, intimate team work between orthopedist and physiotherapist.

In all traumatic cases, with which I suppose this meeting is chiefly concerned, it is presupposed that there has been excluded postural defects with their consequent relaxation, congenital anatomical defects, and all abdominal pathology which might cause a somewhat similar clinical picture.

The traumatic cases which come to the Department of Physiotherapy at the Boston City Hospital exhibit muscle spasm as their predominant factor.

Relieve the spasm, add what fixation is necessary, if necessary, for a short time, institute what may be called general tonic measures, and as soon as possible employ proper voluntary muscle exercises not only to restore muscle tone but also to relieve the mental inhibition that exercise or work is impossible.

Many of the cases we see are found, on X-ray examination to have had an old hypertrophic spine, which the trauma cause to flare up. Once in a while, we find the classical hitherto unrecognized vertebral crush. Rarely indeed, but still quite definitely, we find a true sacroiliac.

Treatment.

1. Hypertrophic spine aggravated by trauma. In these cases diathermy (internal baking) seems to give the quickest relief. This is due probably to the active hyperemia which it produces locally with consequent tissue drainage, and to the marked muscular relaxation it induces muscle spasm which is not of central origin.

Technic. Place a metal electrode, generally 2x10 inches over the lumbar region of the spine, while anteriorly there is held on the abdomen by means of a sandbag or the hands of the patient a 10x12 inch metal electrode. Treat for at least 20 minutes with whatever current strength the patient can stand without discomfort. This will usually register on the meter from 800 to 1200 milliamperes. Of course if there is the slightest degree of pricking it means that good contact has not been secured, and poor contact may mean a burn.

If pricking does occur the area where it exists should be firmly pressed against the skin. If this does not remedy it, the electrode should be reapplied. At times when the pain is severe, galvanism, with the positive pad posteriorly and the negative anteriorly for 25 to 30 minutes, 15 to 40 milliamperes, will accentuate the effects of diathermy. In some cases, betimes, a low back brace insures a certain degree of physiological rest. If the process is fairly old, and the exacerbation not too acute, deep massage, vibration, the static wave current or the slow sinusoidal will shorten the time of disability. At times, also the application of radiant heat will, by dilating the cutaneous capillaries, deplete the enlarged deeper muscle and relieve pain and stiffness. By some of the above methods the classical six months minimum may be materially lessened. Here again it is assumed that all possible foci of infection have been eliminated such as teeth, tonsils, sinuses, gall bladder, prostate or pelvic infection, etc.

2. Sprain of the lumbo-sacral or lower lumbar joints. These are the so-called "lifting strains" where the patient feels that something gives way and perhaps hears a snap. These are generally ligamentous or muscle tears. The ligamentous ones are characterized by soreness and tenderness which are deeper situated. Here again, muscle spasm stares us in the face. Pain is elicited by lumbar movement. The erector spinii muscles, deep spinal ligaments or the ligaments which are inserted about the sacrum or sacro-iliac joint, are chiefly involved. The muscle spasm is naturally a reflex one due in part to nerve pressure, which pressure is caused by the resultant edema or possibly hemorrhage into the soft tissues. Physiological rest, an adequate back support and immediate physiotherapeutic measures should and do lessen the duration of disability. Again diathermy with larger electrodes than hypertrophic arthritis, but with the posterior one appreciably smaller than the anterior; followed by the sinusoidal or the static wave current, has given us the best results.

3. *Sacro-iliac strain often associated with sciatica.* Here, manipulation followed by short *adequate* strapping, diathermy or baking, sinusoidal or static wave current, and deep massage or vibration, should achieve quick results.

4. *Myositis.* Though this diagnosis has been overworked at times, yet inflammatory processes do occur in muscles; and true myositis is quickly relieved by radiant heat, deep vibration, massage, and static sparks. At times diathermy or the slower heating process of galvanism, with a positive pad over the contracted muscle will also achieve the same result.

5. In spinal infections, such as tuberculosis or osteomyelitis, in addition to appropriate orthopedic and surgical measures, ultra-violet light therapy given both locally and generally, at least deserves a trial.

6. *Periostitis.* A few cases have shown under X-ray examination, a definite periostitis which has persisted and which has caused severe pain. Either because of or in spite of diathermy, a fair percentage of such cases have promptly recovered.

7. *Malingerers.* We get them at times. It is hard to say a man hasn't a pain in his back just because we can find no objective evidence. In most of these cases, the greenback has all other therapeutic measures beaten by a large margin.

From *The Industrial Doctor.*

□ □ □

WHY?

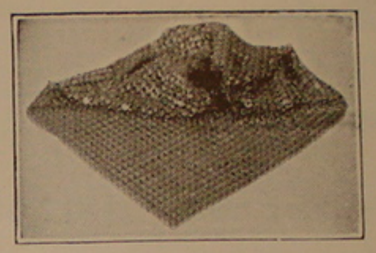
I like my dentist. He's a friend I would not do without.
How quickly he relieves my pain! He knows what he's about.
My doctor, too, is surely good at curing human ills.
He always knows just what I need of poultices and pills.
Their offices they have equipped with up-to-date Fischer machines;
But tell me why will they display such ancient magazines?

(With apologies to A. D. Ihrie.)

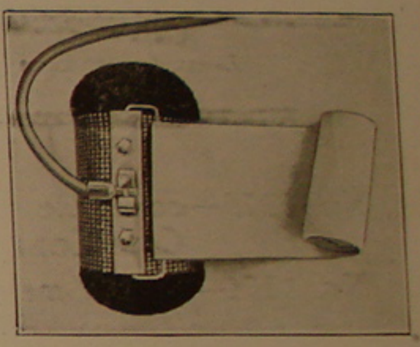
Smooth-Link Mesh Electrode Material

It is quite significant to note that while nearly three-quarters of a million square inches of our German Silver Mesh Electrode Material are in use throughout the country, most of the recent orders are "repeats." It seems that "once tried, always used" fits exceptionally well in this case, as those who are using Mesh continue to buy more of it.

We feel very sure that a number of our readers would be glad to look through our latest No. 14 Accessory Catalog in which this is only one of hundreds of interesting items. Just send a card, and we will mail catalog at once.



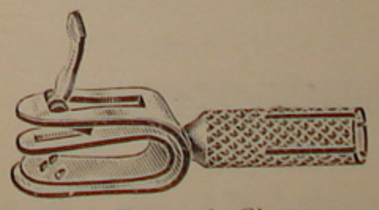
A Mesh Electrode



Combination Mesh and Rubber Sponge Electrode



Section of Electrode showing exact size of links



Mesh Electrode Clamp.

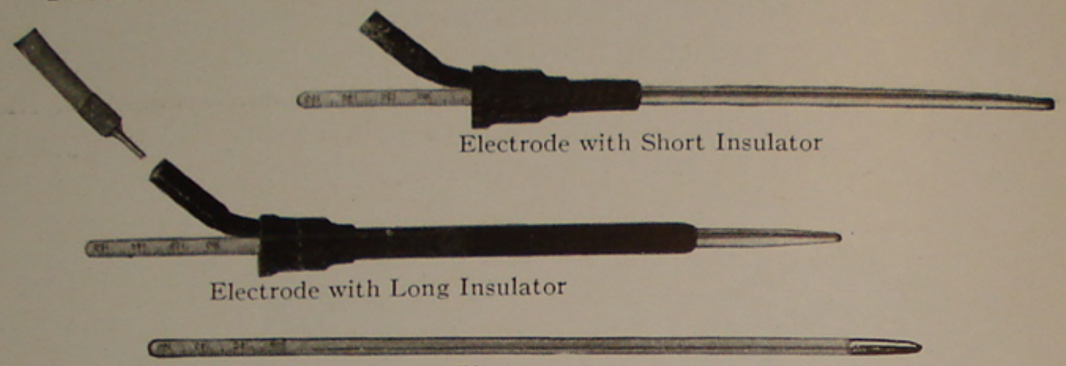


Application Mesh Electrode

The Corbus Endocervicitis Electrode

For the treatment of Gonorrhoeal Endocervicitis with Diathermy. Thermometer registers degree of heating obtained, Fahrenheit.

Instrument consists of four pieces.



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Electrode with Long Insulator

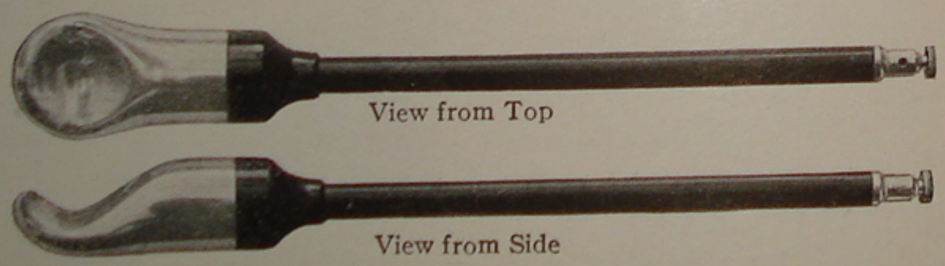
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The Fischer-Chapman Endocervicitis Electrode

Designed along scientific lines, with size and shape of polished metal end to properly engage the lips of the cervix. The shank, or handle, is made of hard rubber. This electrode is to be used with Diathermy Current.



View from Top

View from Side

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The Waggoner Physiotherapeutic Lecture Courses

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There will be two such classes held in the month of September

KANSAS CITY, MISSOURI
September 15th to 20th
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MINNEAPOLIS, MINN., Sept. 29th to Oct. 5th

Personally Conducted Courses, Clinics, Lectures
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MEL. R. WAGGONER, M. D.
Cedar Rapids, Iowa

DOCTOR WAGGONER will also appear during the balance of 1924 at
Chicago, Illinois, October 20th to 24th.
Chicago, Illinois, October 27th to Nov. 1st.
Charlotte, North Carolina, November 10th to 15th.
New York, New York, November 17th to 22nd.
Cleveland, Ohio, December 8th to 14th, etc.

—Watch for Announcements in "Fischer's Magazine"

A PAGE OF FUN



Jock and Janet were sweethearts and were sitting together one night in the front parlor. Jock was silent for a long time.

"A penny for your thought," said Janet.

"I was thinking I would like a kiss," said Jock.

Janet gave him one.

Again he sat in silence for a long time.

"Were you thinking you would like to kiss me again, Jock?"

"Na, I was thinking you didna gi' me the penny."

□ □ □

A dairy maid milked the pensive goat,
And, pouting, paused to mutter
"I wish, you brute, you'd turn to milk,"
And the animal turned to butt her.

A teddy bear sat on a cake of ice,
'Twas cold as cold could be.
He soon got up and walked away,
"My tale is told," said he.

□ □ □

Wifie: "I suppose now you wish you were free to marry again?"

Hubbie: "No—just free."

□ □ □

Bride (consulting cook-book): "Oh, my, that cake is burning and I can't take it out for five minutes yet!"

□ □ □

She: "Your new furs are magnificent, my dear; what did they cost you?"

Her Friend: "Three fits of hysteria."

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The teacher was examining a class in physiology: "Lucy, will you tell us what is the function of the stomach."

"The function of the stomach," the little girl answered, "is to hold up the petticoat."

□ □ □

Conductor: "Watch your step, Miss."

Flapper: "It's not necessary; there are several sapheads behind doing that!"

BELIEVE IN YOUR OWN ABILITY TO DO BIG THINGS.

ONLY BY HAVING FAITH IN YOURSELF CAN YOU COMPEL OTHERS TO HAVE FAITH IN YOU.

Program for Our

Monthly Physiotherapeutic Meeting

Monday, November 10th, 1924

L. C. SAMMONS, M. D., Shelbyville, Ind.
"Physiotherapy in General Practice" . . . . . 10:00 to 11:00 A. M.

WM. E. HOWELL, M. D., Chicago, Ill.
"Ease and Effectiveness of Electro-Coagulation Operations". . . . . 11:00 to 12:00 Noon

D. W. KOBAK, M. D., Chicago, Ill.
"Diathermy and Sinusoidal as Complimentary Technic" . . . . . 1:30 to 2:30 P. M.

ABRAHAM R. HOLLENDER, M. D., Chicago, Ill.
"The Influence of Medical Diathermy on Tinnitus Aurium" . . . . . 2:30 to 3.15 P. M.

MAURICE H. COTTLE, M. D., Chicago, Ill.
"The Scope of Indirect Diathermy in Certain Eye Conditions" . . . . . 3:15 to 4:00 P. M.

How to Get Here:

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BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont; or

BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

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FISCHER'S MAGAZINE

Fischer CHICAGO, ILL.

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OCTOBER, 1924

THE SECRET OF SUCCESS IS CONSTANCY OF PURPOSE.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. II OCTOBER, 1924 No. 11

Leaders are Learners

IT has been said, and no doubt widely believed by the laity, that no man gets a new idea after thirty—or thirty-five, or forty. The age varies, but the statement is just as gravely erroneous, it seems to us, though the limit be set at seventy—or ninety.

That there are people to whom new ideas come as unwelcome and disturbing visitors, there can be no doubt. You will find them of all ages and all professions. But you will never find a *leader* among them.

For leaders are learners, all their lives long. Out of their daily experiences, out of their contact with others, out of the books and magazines and treatises they read, successful men are constantly drawing a fund of new knowledge that can be applied in the conduct of their professions and their lives.

Have you ever noticed that one of the common characteristics of big men is their inquisitiveness? They always, one and all, are looking for the why and wherefore of things. Make a statement to one of them, and, often as not, he will question it; not because he doubts the truth of what you say, necessarily, but because he wants more details, a more complete and accurate picture of the facts. Yes, leaders are learners. But learners, too, of the essential things. All of us learn, from day to day, and from hour to hour. Our

minds entertain a constant procession of new thoughts. Whether those thoughts are of baseball, for example, of society, or of our professional work, is the important thing.

That is where the real leader has the advantage of the rest of humanity. Whether it is born in him or he has acquired it through hard experience and self direction, he possesses clear knowledge and clear vision in connection with the one big thing that to him is worth while.

And that thing is—leadership and success in his chosen profession.

Diathermy

FRANK B. GRANGER, M.D.
Boston, Mass.
Associate Editor of the Physiotherapy News Bulletin

Diathermy, or internal baking, has masqueraded under a number of synonyms such as thermo-penetration, thermo-faradic (as its name indicates, a poor diathermy), endo-thermy, etc.

While it is a high frequency current, ordinarily of the D'Arsonval type with a fairly high voltage and milliamperage, yet in practice it varies widely, dependent upon the construction of the high frequency apparatus employed. It is evident that a machine wound to give a high milliamperage and a relatively low voltage will have less ability to overcome resistance and consequently less power of deep tissue penetration than one constructed to deliver a much higher voltage with a somewhat less milliamperage. It should have voltage enough, however, to insure its passage in parallel lines from one electrode to the other. In all other electrical currents, except perhaps the static, the electrical lines of force do not go in straight lines through the tissue from electrode to electrode, but are diffused in widely divergent ones, and are only concentrated at the points of contact of the electrodes.

Hence it necessarily follows that the deeper structures are much less under the influence of the electrical current. Diathermy, on the contrary, provided as stated above the voltage is sufficient, flows in a straight line from electrode to electrode and the intervening tissues are generally well heated with of course a greater intensity of heat nearer the smaller electrode. It is this process of generating heat within the tissues that makes diathermy so valuable. All other forms of heat are to a great degree blocked in their penetration by the skin, whether they are conductive heat such as the hot water bottle or electric heating pad, or convective heat such as incandescent light applicators or the arc light. Diathermy, however, is true conversive heat, that is heat generated in the tissues; hence it penetrates deeply and to a great degree uniformly.

The penetration and clinical results of the infra-red rays, despite generous advertising is still a mooted question.

Diathermy then is a high frequency current ordinarily of the D'Arsonval type with sufficient voltage to overcome tissue resistance, and with sufficient amperage or quantity to heat, because of internal tissue resistance, the structures through which it passes, as it flows in straight lines from one electrode to the other.

Diathermy may be divided into medical and surgical diathermy. Surgical diathermy, which includes electro-coagulation and dessication, will not be considered in this paper.

Medical diathermy may be divided into direct and indirect diathermy. Auto-condensation is the most important example of the indirect type.

The methods of application of direct diathermy are the lateral method, the double cuff method, and the cuff and water method.

Of these the first, the lateral method, insures the greatest concentration of heat to a given local area in the shortest time. The cuff method is also efficient but requires a much

longer time of application. The cuff and water method is the least efficient. It is ordinarily used where the toes or fingers are to be diathermatized.

Materials

Only a metal contact should be employed such as block tin, preferably 22 gauge Crooke's metal, organ pipe metal, limpit metal, or metal mesh. The interposition of moist cotton, felt, or asbestos increases greatly the chances of a burn. Either one of two things may happen. The pads may become dry, more resistance ensues, carbonization takes place, and the tissue is showered with fulgeration sparks; or as has happened with the asbestos type the metal back may become disintegrated and the area of contact be thus greatly reduced in size with consequent concentration of current strength, and an electro-coagulation of the part under treatment. Great care should be taken in preparing metal electrodes. They should not have any sharp edges. They should be perfectly smooth so that no undue pressure might be exerted. If they have been used before, good contacts should be ensured by smoothing them with a squegee, or even a large static spark ball. In hospital practice the skin is well lathered before the electrodes are applied. In the office, where there is presumably less rush and aides with wider experience, the electrodes are dropped into basins of hot water in order that the metal may feel warm, and are placed in position with only the small amount of moisture present which may cling to them. If the current is gradually turned on, the resistance of the skin should be overcome without any discomfort to the patient. If the part is hairy it should be well lathered or shaved. The electrodes should then be bound on with an elastic bandage such as the Ace. A paper or cotton bandage may also be employed. I ordinarily use a cotton bandage or a rubber strap (old inner tubes are handy for that purpose). The contacts should be exact, and if the patient complains of burning or prickling the metal should be firmly pressed against the skin over the area in question.

If this does not give relief, the metal should be reapplied. This is important, for if the metal is not in close contact with the skin, the passage of minute sparks will in time either fulgerate or coagulate, and a high frequency burn will ensue. These burns are not ordinarily harmful, unless they are deep enough to cause a scar, but they are bad technic. If by any chance the skin is anesthetic, the greatest care should be employed. Much has been written concerning the swelling of the tissues under the diathermic electrodes. I think that this has been overstated, and it is much better to bind on snugly enough to secure good contact, thus avoiding a burn. As stated above it is better to use a bandage which is somewhat elastic. A gauze bandage may exert undue pressure on some part, and from this excessive pressure and the resultant ischemia, a burn may result. For this reason also it is well to avoid bony prominences.

Dosage

From 50 to 100 milliamperes per square inch of contact is ordinarily sufficient. If the arteries are sclerotic 50 milliamperes is better than 100.

Spark Gap

The spark gap should be in good working order, special attention being paid to its cleanliness. It is better to have the spark gaps fairly close and to increase the amount of current by allowing more to come in from the alternating current mains rather than to use a wide open, spluttering spark gap as thereby a faradic character may be imparted to the diathermy which would not only be more disagreeable to the patient, and less current could be used, but it would also act as a stimulating diathermy rather than as a sedative one.

Time of Treatment

This cannot be exactly interpreted in minutes as the result and the reaction are the main factors. In general it takes at

least 20 minutes to heat thoroughly a part. With the double cuff method the treatment should be continued until the skin between the inner edges of the electrodes becomes hot. This may take from 20 to 60 minutes.

Frequency of Treatment

This depends on the underlying pathology. For the relief of pain, or in a pneumonia, one or two treatments a day may be necessary. In non-union or delayed union of bone, two or three times a week will suffice.

Some Special Indications for Diathermy

1. Non union or delayed union of bone. Here diathermy, where a fair degree of fixation of bone can be secured, is of value. Wherever possible the lateral method is used. If apparatus can not be removed, the cuff method is best.

2. Bursitis, especially subdeltoid with calcification. Under diathermy and chlorine ionization through the shoulder followed by massage and gentle manipulation the calcified bursae disappear.

3. Hypertrophic arthritis. Here, provided overgrowth of bone is not a mechanical obstruction, and even though the X-ray picture remains unchanged, prompt symtomatic relief is usually obtained by diathermy and ionization. Numerous cases physically incapacitated are returned to gainful occupation for periods of many months.

4. Pneumonia. An internal poultice such as is afforded by diathermy, the increased local temperature (nature's method), the increased hyperemia and drainage, and the augmented phagocytosis all seem to mark the use of diathermy as a rational procedure. Often the improvement in the pulse, disappearance of cyanosis, and the decrease of pain, is coincident with the treatment. Treatments may be given twice daily.

5. Neuritis. Frequently a very acute neuritis will be more quickly relieved as regards pain by diathermy than by any other method. The double cuff technic is usually employed. In brachial neuritis, not infrequently the cervical and upper thoracic spine is affected, hence in such cases I employ the following technic: Suppose it is the right arm—place a semicircular strip of metal over the left side of the spine, and a cuff over the upper arm. Diathermatize until the shoulder is hot, 600 to 900 milliamperes. Remove the cuff from the upper arm and place it around the wrist continuing until the whole arm is hot. The first treatment will often cause increased pain, but this apparently is not a bad sign.

6. Spasticity. This is best treated by diathermitizing the appropriate centers in the spine, and then by the double cuff method, heating the spastic muscles.

7. The contra-indications to diathermy are two:
   1. Pus without drainage.
   2. Lesions where there is likelihood of hemorrhage.

Diathermy: A Specific for Gonorrheal Epididymitis

BUDD C. CORBUS and VINCENT J. O'CONOR
Chicago, Illinois

Gonorrheal epididymitis occurs in from 20 to 30 per cent of all cases of gonorrhea. It is more prevalent in dispensary than in private practice. This painful and destructive complication, in an economic way alone, represents the sum total of time lost in 90 per cent of the cases of specific urethritis.

During the past seventeen years the management of this condition has received serious and more detailed consideration from urologists in general but particularly from American urologists. This was largely stimulated by the work of Hagner, Bazet and Belfield.

The time honored method of treating this class of cases by elevation or strapping of the testicles, rest in bed, and the external application of heat or cold, incapacitates the patient for from five to fourteen days and may later necessitate operation to drain the infected epididymis.

The interest in this troublesome situation, from a surgical point of view, has become so keen that few patients escape the procedure of epididymotomy. This is not only true of patients in private practice but in most dispensaries as well. The results of this operation, in a large proportion of cases, have been excellent but the patient must be laid up at least three to ten days.

While the outcome of an individual case of gonorrheal epididymitis is rarely in doubt, the disability which accompanies the usual methods of treatment is annoying and embarrassing both physically and financially.

It is apparent that any method which can abort the attack, or stop the pain and absolutely eliminate the usual incapacity, would be a decided step forward in this type of therapy.

Knowing that the gonococcus is instantly destroyed at a temperature of 108° F., it occurred to us that if a suitable instrument could be devised we could induce sufficient heat within the body of the epididymis to destroy the gonococcus in its local invasion, stop the pain and abort the attack. This knowledge was gained by an experience of several years in the application of diathermy in the treatment of cancer and in gonorrheal endocervicitis. The results of these studies are published elsewhere.

We have been so successful with this procedure that we believe we are justified in calling this method a specific for gonorrheal epididymitis.

Description of Instrument

The instrument as devised by one of us (B. C. C.) consists of a fiber clamp with curved arms, one of which is movable.

This movable arm may be fastened at any desired point by means of a lock-nut. Two concave discs are attached to the distal ends of the arms. These discs measure 4 cm. in width and 5 cm. in length, and are swiveled that they may be easily adjusted. Each disc connected to a binding post so bi-polar current may be applied. The electrode is rigidly constructed and, due to the self adjusting discs, is applicable to any size scrotal content.

Method of Application

The patient is placed in the recumbent position and the scrotal and suprapubic region exposed. Shaving soap lather is placed between the skin and the contact point of the electrodes. The entire body of the testis and epididymis is encased between the apposed electrode surfaces and heated uniformly by the d'Arsonval current. In order to effect the greatest degree of heat induction possible in the individual, the current is increased to the extent of cutaneous discomfort. When this point is reached the current is then reduced slightly so that no unpleasant sensation accompanies the treatment. Our routine has been to apply the heat for at least forty minutes, since even at 104° to 106° F. the gonococcus is killed during this time. In those cases seen during the first twelve to twenty-four hours of epididymal involvement by the gonococcus one such treatment has usually sufficed to check the attack and start the process of resolution. In those instances where the inflammatory reaction has been present for a number of days, three or four treatments on successive days have been sufficient to eliminate all untoward effects.

A very distressing funiculitis often accompanies the epididymal involvement and may persist after the symptoms of the latter have completely subsided. This is as quickly relieved by placing the instrument in a vertical position with one electrode over the globus minor and the other over the

region of the internal abdominal ring. This permits an induction of heat throughout the accessible portion of the vas deferens; this should be continued for forty minutes.

So mild is the attending inflammatory reaction following a heat treatment for gonorrheal epididymitis, that there is absolutely no hydrocele present. Both poles of the epididymis are distinctly palpable as hard painless nodules, this is rendered more distinct on account of the absence of any orchitis.

A Few Typical Case Reports (Quoted)

Case 1. R., aged thirty-five years, during the course of an acute urethritis motored several hundred miles in one day. That night his right epididymis became very tender and gradually enlarged. The next morning, August 2, 1923, when he presented himself the entire epididymis was swollen to five times normal size. There was slight accumulation of hydrocele fluid, temperature 101°, pulse, 110, leucocyte count 13,500. The patient was very weak and could hardly walk so great was the pain in the right testis and groin. It was imperative to his business interests not to be laid up that week because of a local convention. Diathermy for forty-five minutes was followed by complete relief from local pain. The following day the patient felt perfectly well. There was no local pain or tenderness although the lower pole of the epididymis was three times the normal diameter and very hard. The patient had no further discomfort and five days later his scrotal content seemed normal.

Case 2. H., aged twenty-three years, professional dancer developed a left gonorrheal epididymitis in the fifth week of an acute urethral infection. He presented himself, October 10, 1923. Left scrotum red and swollen to twice the normal size. Lower pole of the left epididymis was markedly swollen and so tender that palpation caused severe prostration. There was very slight hydrocele present. Temperature 100°, pulse rapid. Diathermy for one hour gave marked relief. The patient was very anxious to avoid prolonged absence

from the stage but was advised to remain in bed for the following twenty-four hours. A similar diathermy treatment was given the following day and complete subsidence of all pain, swelling and tenderness was noted on the second day. In spite of repeated warnings the patient persisted in doing his acrobatic dancing stunts for an aggregate of thirty minutes each day. The scrotal content was kept elevated by an elastic supporter. No recurrence took place and five days later both testis and epididymis were normal. The patient lost only one day of work.

Case 3. P., aged twenty-two years, presented himself October 1, 1923, with a left gonorrheal epididymitis of three weeks duration. Rest in bed, hot applications or tight suspensories had failed to do more than temporarily relieve the pain and swelling. The epididymis was twice normal size hard and painful on palpation. The vas deferens was half again as large as normal and was tender as far up as the external inguinal ring. Walking even with a well-fitting suspensory, was attended with a sickening pain in the left testis and groin. Diathermy for one hour gave no apparent immediate relief. Twenty-four hours later the pain left the epididymis completely and the patient declared on the third day that there was absolutely no discomfort. The acute swelling had entirely subsided four days later and there has been no recurrence.

These 3 cases are typical of the results obtained in a series large enough to justify our enthusiasm as to the specificity of diathermy for gonorrheal epididymitis.

Summary

Diathermy provides us with a method of inducing heat within the body of the epididymis, testis and spermatic cord. By using the electrode described above the gonococcus can be rapidly destroyed in its local invasion obviating prolonged inactivity or operative interference. Our results with this

(*Cont'd. on page 14*)

THIRD ANNUAL

PHYSIOTHERAPEUTIC CONVENTION

CHICAGO, ILLINOIS—OCTOBER 20 to 24, 1924
at the LOGAN SQUARE MASONIC TEMPLE

H. G. Fischer & Company join with the following physicians in cordially inviting you to attend what we are confident will prove to be "the greatest meeting of Physiotheraputists of all time".

The following physicians of note will participate:

E. C. HENRY, M.D. . . . . Omaha, Nebr.
Chief of Staff, the Lord Lister Hospital—*Chairman.*

MILES J. BREUER, M.D. . . . . Lincoln, Nebr.

W. B. CHAPMAN, M.D. . . . . Carthage, Mo.

MAURICE H. COTTLE, M.D. . . . . Chicago, Ill.
Eye, Ear, Nose and Throat Surgeon at the American Hospital.

LEO C. DONNELLY, M.D. . . . . Detroit, Mich.

EMILE C. DU VAL, M.D. . . . . Chicago, Ill.

R. F. ELMER, M.D.. . . . . Chicago, Ill.
Attending Surgeon, Chicago General Hospital.

CHAS. H. FREDRICKSON, M.D. . . . . Chicago, Ill.
Attending Physiotherapeutist, the U. S. Veterans' Bureau.

DEAN W. HARMAN, M.D. . . . . Ames, Iowa

ABRAHAM R. HOLLENDER, M.D.. . . . Chicago, Ill.
Attending Eye, Ear, Nose and Throat Surgeon, the American Hospital.

WM. E. HOWELL, M.D. . . . . Chicago, Ill.
Attending Physiotherapeutist at the American Hospital.

D. FRANK KNOTTS, M.D. . . . . Chicago, Ill.

DISRAELI W. KOBAK, M.D. . . . . Chicago, Ill.
Attending Physiotherapeutist, the Cook County Hospital.

GUSTAV KOLISCHER, M.D.. . . . . Chicago, Ill.
G. U. Surgeon at the Michael Reese and Mount Sinai Hospitals.

ARTHUR LA ROE, M.D. . . . . Newark, N. J.
Formerly of the U. S. Public Health Service and U. S. Veterans' Bureau at Newark, Staten Island and New York.

ELLIS G. LINN, M.D. . . . . Des Moines, Iowa

FREDERICK H. MORSE, M.D. . . . . Boston, Mass.
Ex-president the American Electrotherapeutic Association.

ROSWELL T. PETTIT, M.D. . . . . Ottawa, Ill.
Physician-in-charge at the Illinois Valley Hospital.

CURRAN POPE, M.D. . . . . Louisville, Ky.
Medical Director the Pope Sanatorium, and Consulting Neurologist and Physiotherapeutist to Saint Anthony's Hospital.

A. L. SMITH, M.D. . . . . Corry, Pa.

HARRY EATON STEWART, M.D. . . New Haven, Conn.
Director New Haven School of Physiotherapy, formerly supervisor Physiotherapy Bureau U. S. Public Health Service, Washington, D. C.

HARRY M. THOMETZ, M.D. . . . . Chicago, Ill.
Assistant Surgeon the Illinois Eye and Ear Infirmary, and late of the U. S. Government Service.

NORMAN E. TITUS, M.D. . . . . New York, N. Y.
Vice President American Electrotherapeutic Association and New York Electrotherapeutic Society. Director of American Academy of Physiotherapy. Director of Physiotherapy, Beekman Street Hospital.

ALBERT F. TYLER, M.D. . . . . Omaha, Nebr.
Professor Roentgenology Creighton Medical College, Roentgenologist St. Joseph's Immanuel, Paxton and Douglas County Hospitals.

MEL R. WAGGONER, M.D. . . . Cedar Rapids, Iowa

Several other physicians skilled in Physiotherapy have promised to be present and to lend their assistance. These meetings will be open only to licensed physicians of good standing. There will be no charges, and no obligation imposed by attending.

This is the one meeting of the year that you cannot afford to miss!

original method have been so uniformly satisfactory that we feel free to describe it as one which is specific for gonorrheal epididymitis.

Jour. Urology.

Physiotherapy in Government Hospitals

The following extracts from General Order Number 68D, U. S. Veterans' Bureau, issued by Director Frank P. Hines, and bearing date of June 4, 1924, shows that physiotherapy and occupation therapy are now a constituent part of the medical care and treatment in U. S. Veterans' Hospitals and in Government Hospitals operated by The War, Navy and Interior Department, and even in the National Homes for Disabled Volunteer Soldiers.

"1. Physiotherapy and occupational therapy in U. S. Veterans' Hospitals are a constituent part of medical care and treatment and, like other clinical measures, shall be carried out under the supervision and control of the Medical Officer in Charge of the hospital, acting under the general direction of Central Office, which will control the appointments of personnel and the furnishing of supplies and equipment. In the case of contract hospitals such occupational therapy and physiotherapy personnel and equipment as are to be furnished by the Bureau shall be provided through the District Manager concerned, and shall be under his supervision, except as hereinafter specified. In the case of Government hospitals operated by the War, Navy, or Interior Departments, or by the Board of Managers of the National Homes for Disabled Volunteer Soldiers, these measures are carried on under the direction of such authorities, and by means of personnel, supplies, and equipment which they provide.

"2. Physiotherapy is the use of physical measures for therapeutic purposes, and includes massage, hydrotherapy, thermotherapy, electrotherapy, actinotherapy, therapeutic exercise, and remedial gymnastics.

"3. Occupational therapy shall include any occupation, mental or physical, definitely prescribed and guided for the distinct purpose of contributing to and hastening recovery from disease or injury, and shall include activities formerly carried on under the designation of pre-vocational training. Neither physiotherapy nor occupational therapy shall be applied except as prescribed by medical authorities. The term "Reconstruction Center" and the title "Educational Director" shall be discontinued, and the head of the Occupational Therapy Service shall be designated as the Occupational Director.

"4. In U. S. Veterans' Hospitals the Medical Officer in Charge, unless he performs such duties himself, shall designate some medical officer especially qualified in physiotherapy to have supervision of that activity whenever such officer is available. The ranking physiotherapy aide shall have charge of the administration of physiotherapy under the direction of that officer. The same officer, or some other especially qualified in occupational therapy, shall when available, be designated by the Medical Officer in Charge to supervise that activity, unless the Medical Officer in Charge performs such duties himself. The Occupational Director shall have charge of the administration of occupational therapy under the direction of that officer. When no officer is especially assigned to have charge of these activities, the ranking physiotherapy aide and the Occupational Director shall be responsible to the Medical Officer in Charge for the proper conduct of their respective departments. * * *

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Until we acquire a more definite knowledge of the causes of hyperpiesis, its treatment must be more or less empirical. However, during the first stage auto-condensation has proven satisfactory.

Prostatitis

Question received:

"Gentlemen:—

In some treatments of Prostatitis both acute and chronic, with diathermia, we have failed to get results. Can you give us any points as to why? Is it the machine or the operator, or both? Have tried every technic described and with no results. This same thing has occurred in some cases of acute arthritis in the knee. In the ankle and wrist we have secured wonderful results. In epididymitis, our paper speaks for that. As you will recall, we are using your Portable at both hospitals. Any suggestions will be more than appreciated."

Answered by W. B. Chapman, M. D. of Carthage, Mo., as follows:

"Dear Dr. Peacock:—

Your inquiry to H. G. Fischer & Company of Chicago has been referred to me. I presume that they have already supplied you with my little pamphlet entitled 'Electrotherapy in Prostatitis,' and I hope that you will read it carefully. In case you have tried this technic without results, I would examine the patient carefully for other complicating diseases, especially tuberculosis and syphilis. I have recently treated a patient from down in your country who was so run-down and anemic that he did not respond to any form of treatment for weeks, but finally began to improve after persistent administration of iron and arsenic both by mouth and intravenously.

Where the patient does not respond satisfactorily, especially in chronic prostatitis, I would give some foreign protein subcutaneously to stir up his resistance. For this reaction I use typhoid vaccine, diphtheria antitoxin or some of the mixed sera or vaccines. It makes very little difference which you use as it is the foreign protein reaction that you desire. These injections repeated on alternate days will often stir up a healthy reaction with fever and an increased leucocytosis and the local condition will begin to improve immediately.

In arthritis of the knee an X-ray will probably show what the trouble is. The knee-joint is weight bearing, and the infection often erodes the cartilage and forms exostoses or roughened areas of bone in the joint. When the patient rests the joint, these areas stick together with excruciating pain to the patient when he attempts to move again. Neither medicine nor diathermy will help this condition as it is strictly operative."

The Treatment of Tumors of the Bladder

By HOWARD A. KELLY, M.D., F.A.C.S. and
WILLIAM NEILL, Jr., M.D., F.A.C.S.

From the Howard A. Kelly Hospital, Baltimore, Md.

The problem of tumors of the bladder, so long treated as the stepchild of urology, has in recent years taken on a new interest owing to the advent of several new factors. First of all, there is the more ready recourse to surgery of the viscus, exposing the tumor and attacking it effective in loco; then, there is the use of radium which has been found curative in an astonishing percentage of cases; and, finally, a new agent has come to claim a position in recent years, by which a current of electricity directed to a spot acts as a desiccating agent (endothermy) capable of penetrating the depths of the tumor and destroying it rapidly and without hemorrhage.

Surgery. Surgery is the most aggressive procedure and the only one associated with a serious risk. The limitations of surgery are at present, as in the past, due to the fact that with rare exceptions it is only applicable to isolated pedunculate growths, the simplest group under discussion, while it is worse than useless in any carcinoma invading the bladder wall. With the new agents now at our disposal, it is difficult to see just what field will remain for the pure surgeon except to employ his art as an adjuvant to the use of radium or endothermy,—that is to say, in exposing the field through a suprapubic opening in the bladder for the treatment. We, ourselves, have felt a serious temptation to spend considerable time in developing another form of surgery, however, that is to say, to labor to acquire skill in operating through the open cystoscopic, 14 cm. long and 10 mm. in diameter; especially in the female bladder does this method afford access to all parts, opening up a way for working with delicate instruments. In the male the instrument must be longer. It is quite certain, however, that any

attempt to remove a tumor by means of forceps, knife, or scissors is necessarily exposed to a risk of serious hemorrhage and should, therefore, be eliminated.

Electric Coagulation or Endothermy. We have for years used fulguration in attacking papillomata through our open air cystoscope with the patient in the knee-chest posture, but have always found that the chief difficulty was that we were able to make so little impression on a massive tumor at one sitting, even though we attacked the pedicle. Fulguration seems to yield its best results in sparking out superficial flat areas of disease where the papillary tumor is disseminated. In papillary carcinomata with infiltration, it is of course worse than useless. It is not our desire, however, to deprecate an agent which in a limited field has proven such an advance over previous ineffective methods.

More recently, an effective apparatus has been devised by Edward V. Clark of Philadelphia and extensively utilized by his former co-adjutor, Dr. George A. Wyeth of New York, who has brought this machine to a remarkable perfection. Wyeth, who is also a first class surgeon, as well as urologist, has made use of the desiccation and endothermic method to destroy tumors in the bladder by making a suprapubic opening and then penetrating and desiccating the disease in an area all around the base of the tumor which is then undermined, desiccated, and removed. The method is not applicable where there is basal infiltration but only to the papillary carcinomata not yet become invasive and to simple papillomata.

The writers believe that this method affords an extraordinary facility for dealing with these tumors without an incision, through the open cystoscope, in the male as well as in the female, and that in this way it will be possible to desiccate the bases of all pedunculate tumors and destroy them as a rule at a single sitting. Such a procedure simply calls for dexterity in the use of a cystoscope and in introducing a long well insulated needle to be brought into contact

with the base of the tumor or to be plunged into it. This will cut out the use of radium in all but the infiltrating, metastatic, or superficially widespread types, a welcome retrenchment in the radium field.

In recapitulation, the method which has the widest field of utility is the use of radium, and we have here an agent whose value is not yet fully appreciated in dealing with those otherwise hopeless cases. The endothermic method, however, greatly simplifies and extends and helps the radium application in removing masses of disease and curing the patient quickly in the simpler cases, and in limiting the field for radium to those in which the bladder wall is invaded.

Abs. from *Ur.* and *Cut. Review.*

Electro-Coagulation Essentials

By T. HOWARD PLANK, M.D.
Chicago

The first essential for good results from electro-coagulation is a good working knowledge of anatomy; the second and equal essential is a good grounding in pathology, for one must know how far he can go with the destruction, and electro-coagulation in destruction, and equally one must know how far it is necessary to go to obtain good results, and this can only be accomplished by having the necessary information at one's finger tips.

The limits of the pathology in the case at hand are the boundary lines that he must reach to obtain success. If the anatomy of the parts will not permit of this amount of destruction then the case is not one for electro-coagulation and some other method of treatment is to be followed.

The third essential is as perfect a knowledge of the destructive agent used as it is possible to obtain. In this instance it is the high frequency currents, either Oudin or D'Arsonval, either unipolar or bipolar, depending entirely upon what one wishes to accomplish.

The fourth essential is a machine that will deliver a non-faradic current. A current that is high enough in frequency and properly balanced in amperage and voltage to deliver heat, not electricity. Remember that the destruction by electro-coagulation is accomplished by heat and this is produced by the resistance of the tissues to the passage of the current; friction if you wish to liken it to such. If your machine gives too low a frequency, nerve impulses will be generated. If of too low an amperage and too high a voltage greater nerve impulses will result.

Proper anesthesia for continuous operation without danger to the patient is the next essential, and this is best accomplished by the use of morphine sulphate, one-fourth grain, and hyosin hydrobromate one one-hundredth grain, given one and one-half hours before beginning the operation and a like dose repeated three-fourths of an hour later, to be followed immediately before operation with enough ether to produce profound anesthesia.

The following are essential to a smooth operative technique: proper applicators for the case at hand which can be changed in a moment's time to one better adapted for a particular part of the operation being performed; applicators that require the least possible attention of the operator; a good reliable foot-switch to give the operator perfect control of the current at all times. With the above essentials should go as much operative experience as it is possible to acquire. Remember first, last, and always that electro-coagulation is a surgical procedure and must be so kept and considered. It is the sharpest knife you ever handled, yet it causes no bleeding, no after pain, and does give results that cannot be accomplished in any other way or by any other method known to the medical profession today. Add it to your surgical armamentarium.

Med. Herald.

Physiotherapeutic Lectures at Omaha

A very complete program has been arranged for November 3, 1924, in the LECTURE HALL, 1118 Farnam St., Omaha, Nebraska.

The entire morning will be devoted to a practical Clinic in X-RAY, RADIUM and PHYSIOTHERAPY at the RADIUM HOSPITAL—conducted by D. T. Quigley, M.D., and H. L. McLeay, M.D., of Omaha, and W. B. Chapman, M.D., of Carthage, Missouri.

W. B. Chapman, M. D., of Carthage, Missouri, will have two afternoon appearances: "The Practical Use of Medical Diathermy" and "Quartz Light Therapy."

W. Scott Keyting, M. D., Salt Lake City, Utah: "Physiotherapy Modalities and When to Select Them."

T. B. Lacey, M. D., of the Glenwood State Hospital, Glenwood, Iowa: "The Use of X-rays in the Treatment of Mongolism."

Roland G. Breuer, M. D., of the State Sanitarium for Tuberculosis, Norton, Kansas: "The Limitations of Physiotherapy in the Treatment of Pulmonary Tuberculosis."

E. G. Linn, M. D., Des Moines, Iowa: "The Value of Diathermy in the Treatment of Certain Diseases of the Ear."

Sanford Withers, M. D., Denver, Colorado: "Radiation Therapy."

G. B. Massey, M. D., Philadelphia, will read a paper and conduct a clinic.

There will be a banquet at the University Club, and very likely more papers on interesting subjects, although this is the only definite information we have up to the time of going to press.

All physicians are invited to attend—no cost, no obligation.

Over one-hundred physicians took advantage of the September Clinics and enjoyed a very instructive day.

The Waggoner Physiotherapeutic Lecture Courses

By Mel R. Waggoner, Cedar Rapids, Iowa

Classes for the Coming Season Follow:

Chicago, Illinois - - - - - - - **October 27th to November 1st**
(The Auditorium Hotel)

Charlotte, North Carolina - - - - - **November 10th to 15th**
(Charlotte Hotel)

New York, New York - - - - - - - - - **November 17th to 22nd**
(Hotel Pennsylvania)

Philadelphia, Pennsylvania - - - - - - **November 24th to 29th**

Cleveland, Ohio - - - - - - - - - - - **December 8th to 13th**
(Hotel Winton)

Detroit, Michigan - - - - - - - - - - **December 15th to 20th**
(Wolverine Hotel)

Chicago, Illinois - - - - - - - - - - - **January 5th to 10th**
(Auditorium Hotel)

Los Angeles, California - - - - - - - - **January 26th to 31st**
(Lecture Hall, Professional Bldg.)

San Diego, California - - - - - - - - - **February 2nd to 4th**
(Grant Hotel)

San Francisco, California - - - - - - - **February 9th to 14th**
(St. Francis Hotel)

Seattle, Washington - - - - - - - - - **February 16th to 21st**
(Olympic Hotel)

Personally conducted Courses, Clinics, Lectures

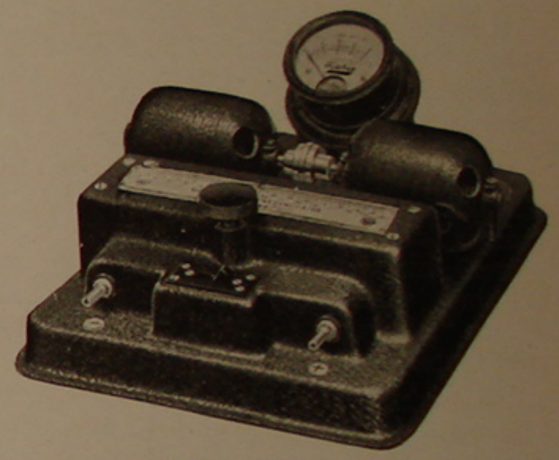
For Details, Fee, Etc., Etc., write the
Secretary of the Waggoner Lecture Courses, at
1664 N. Claremont Ave., Chicago, Illinois.

(Watch for announcements in Fischer's Magazine)

THE FISCHER GALVANIC CURRENT GENERATOR was designed and placed on the market only after repeated requests from operators of Fischer Diathermy and X-ray apparatus—requests for a machine that would generate a perfectly smooth flow of Direct Current at any desired voltage and milliamperage, with an accurate and finely calibrated meter, that would be simple to operate.

We are offering just such an outfit in our Model No. 1200.

The units are mounted on a one-piece metal frame, finished with a crystallized black enamel. The smaller attachments are of brass, heavily nickel plated, and stand out handsomely against the black background.



Model No. 1200

The generating device consists of a small noiseless motor driving a Direct Current generator. The voltage output ranges from zero to 150, and the milliamperage from zero to 25. A "Universal" type motor is employed which is equally effective on either alternating or direct current, at from 105 to 120 volts. The current obtained is direct from the generator—there is no ground connection.

Catalog No. 1200—The Fischer Galvanic Current Generator, with black crystallized finish, with connecting cord and plug, ready to operate from either Direct or Alternating current of from 105 to 120 Volts, with

1—No. 316 Spongio Disc and Handle
1—No. 1900 Hard Rubber Needle Holder
12—No. 1901 Sharp Steel Needles, and
2—No. 1904 Rubber Covered Connecting Cords

Catalog No. 1200 — complete — code GALVAN— price..... **$100.00**

A PAGE OF FUN



R.H.L.: I have asked every one I know what could possibly make a man write a poem like "The Deserted Village," and today a book agent enlightened me by saying, "Oliver Goldsmith was inspired to write The Deserted Village, while in Glasgow, Scotland, on a Tag Day."

One Sunday two lovers went to church. When the collection was being taken up the young man explored his pockets and finding nothing, whispered to his sweetheart: "I haven't a cent; I changed my pants."

Meanwhile the girl had been searching in her bag and finding nothing, she blushed a rosy red and said: "I am in the same predicament."

□ □ □

Tom: "Harry ate something that poisoned him."

Dick: "Croquette?"

Tom: "Not yet; but he's very ill."

□ □ □

"No," she said, "everything's over between us. We're through. Shall I return your letters?"

"Yes, please," replied the rejected one. "There's a lot of good stuff in them I can use again."

Strolling along the quays of New York Harbor an Irishman came across the wooden barricade placed around the enclosure where emigrants suspected of suffering from contagious diseases are isolated.

"Phwat's this boarding for?" he inquired of a bystander.

"Oh," was the reply, "that's to keep out fever and things like that, you know."

"Indade!" said Pat. "Oi've often heard of the Board of Health, but bejabbers, it's the first time Oi've seen it!" □ □ □

What a wonderful bird the frog are,
When he stand, he sit,
When he hop he fly,
ALMOST.
He ain't got no sense,
HARDLY.
He ain't got no tail
Either.
When he sit down he sit on
What he ain't got
ALMOST.

THERE ARE BOATS THAT MIND THE HELM AND BOATS THAT DON'T. THOSE THAT DON'T, GET HOLES KNOCKED IN THEM SOONER OR LATER.

—Elbert Hubbard.

Program for Our

Monthly Physiotherapeutic Meeting

Monday, December 8th, 1924

W. B. CHAPMAN, M. D., Carthage, Missouri.
"The Application of Physical Agents in the Treatment of Pulmonary Tuberculosis" - 10:00 to 11:00 A. M.

T. A. KREUSER, M. D., Chicago, Illinois.
"Galvanism" - - - - - - - - - - 11:00 to 12:00 Noon

C. L. BARBER, M. D., Lansing, Michigan.
"Applied Medical Diathermy" - - - 1:30 to 2:30 P. M.

W. B. CHAPMAN, M. D., will speak informally on "Physiotherapy in General Practice" - 2:30 to 4:30 P. M.

How to Get Here:

DRIVING—Follow Washington Blvd. west to Oakley Blvd., north on Oakley to Wabansia Ave., and one block west, or

BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont, or

BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

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FISCHER'S MAGAZINE

Fischer CHICAGO, ILL.

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362

NOVEMBER, 1924

SHUN IDLENESS.

IT IS THE RUST THAT ATTACHES ITSELF TO THE MOST BRILLIANT METALS.

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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Vol. 11 November, 1924 No. 12

The Convention

NOW that it is all over, we are able to see in perspective the tremendous significance of the Third Annual Physiotherapeutic Convention held at Logan Square Temple during the week of October 20-24. Frankly, during the Convention everyone in the Fischer organization was too busy to devote much time to analysis of the events of those five days!

Aside from the magnitude of the gathering—nearly seven hundred registered M. D.'s were present—perhaps the most impressive feature was the territory covered. Not only was every part of the Union represented, from California to Maine and from Washington to Florida, but there were present physicians from Canada and the West Indies as well. What stronger evidence could there be of the nation-wide establishment of Physiotherapy?

"It has been the most constructive convention that I ever attended," said a doctor from New York. We felt that, too. All through the week there was evident an earnestness and enthusiasm that made the excellent lectures and clinics doubly interesting and valuable to every participant.

There was an undercurrent of supreme confidence evident in both lectures and clinics; confidence based on experience and success, and indicative of the strides that have been taken in Physiotherapy during recent years. Truly, scientific medicine is forging steadily ahead.

Many of the visiting doctors expressed especial appreciation of the arrangements that had been made for their comfort and convenience; accommodations, amusements, stenographic facilities and the like. We were very glad, indeed, to do our best in this respect, for we appreciate that it is to the best interests of all concerned that every visitor be free to devote his attention and energy wholly to the convention itself.

It was a great Physiotherapeutic Convention. The finest of its kind that has been held. When we predict that next year's gathering will be even bigger and better, we are setting a high standard, indeed. To those physicians who are interested in Physiotherapy we can say in full confidence that this Convention was well worth attending and that the next one will be even more so.

This Convention—And the Next

It is not only with extreme pleasure, but with pride, that we announce the *success* of the greatest gathering of physiotherapeutists of all time. The fondest hopes of past years are fast becoming a reality.

A friendly feeling prevailed throughout the big meeting, and we feel safe in stating that every physician in attendance derived even more benefit from the lectures and clinics than he had hoped for. Criticisms were offered, but in every instance they were constructive, and, as in previous years, such criticisms will be of tremendous assistance in planning future clinics.

Our effort next year, however, will be to outclass this meeting in every way. So if, during the course of your stay, you found occasion for constructive criticism, you will help build up these big meetings to a point where they will be of greater benefit and convenience to physicians attending, if you will point out such conditions by corresponding with Mr. H. T. Fischer, Editor of FISCHER'S MAGAZINE, while the affair is still fresh in your mind. We shall tabulate every such constructive suggestion, and make every effort next fall to apply them.

Several eye, ear, nose, and throat specialists suggested a plan of submitting their subjects during one or two successive days, instead of spreading them over the entire week. Many were of the opinion that more clinics, more round-table talks, and more clinical material, would be beneficial and would add to the already excellent program.

The vacancies in the big program, caused by a few physicians who, we regret, were unable to attend or who were called away, were quickly filled by able men, and the big convention hall fairly buzzed with eagerness during the entire five days.

The whole-hearted appreciation expressed by the boys when leaving for home will be an incentive to make the 1925 program greater in every way. I want to take this occasion to thank the physicians in attendance for making the meeting the greatest success ever achieved in physiotherapy, and to express the hope that the next few years may raise the plane on which physiotherapy rests to a point where it will of necessity become the most valued adjunct in *every* physician's office.

To this height we have set our goal.

H. G. FISCHER.

Valedictory to the Convention

By EDWIN C. HENRY, M. D.

Lord Lister Hospital, Omaha—Chairman of the Convention

Gentlemen, the time has come to say goodbye. Since Monday morning, we have been the guests of H. G. Fischer & Co., who have extended us every possible courtesy in this pleasant hall.

You may be interested to know just who *we* are. We come from thirty states of the Union, Mexico, Canada, and the West Indies. We number between six and seven hundred representative physicians of regular medicine.

Here is the criterion as to whether this meeting has been a success or no. Are you going away holding your head a little higher, your spine a little straighter, because you belong to the healing profession? Are you going back determined to reread your Anatomy and Physiology? Have you made up your

mind to look the world squarely in the face and use every means known to Science and Art to help your patient? Have you resolved to dedicate your life to give the sick the best that is in you in service? Then this meeting has been a success.

In summing up such a Convention, only the high points can be touched. Only the things that were of prime importance can be noticed. Almost every speaker has stressed the vital importance of viewing the body as a whole. For example, when a patient has a tubercular gland of the neck, he is a tubercular patient, and instead of focusing our attention on that one gland, we must realize the whole body must be treated. Remember this one from Pope,—"Every patient that comes to you may be soil in which is planted Tuberculosis, Syphilis or Malignant Disease."

It will take a good while to digest the physics of the Actinic Ray as so ably outlined by Donnelly. If we are going to master this new science, we must go back to the old masters just as he has done and study Newton, Tyndal and Helmholtz.

Remember this pungent truth from Donnelly, "All the energy that comes to us making life possible, comes from the Sun." One octave is called visible light. Above that, consisting of three octaves, are rays called Actinic. Actinic rays are just as real, just as demonstrable as visible light. Pettit gave us some wonderful pictures showing how light and Actinic rays cured tuberculosis. He gave Rollier credit for his pioneer work in bone tuberculosis.

Surgical Diathermy was demonstrated as a real aid in treating malignant disease. Dr. Kolischer testified he had given up the knife in cancer of the cervix. Surgical Diathermy, Radium, Deep X-ray, skilfully used, will save an enormous amount of suffering, and there is evidence of many lives being saved. In all of his talks, Dr. Kolischer showed the trained mind of the surgeon with a broad grasp of the field of malignant disease and the action of radiant energy on the cancer cell.

Radiant energy is now an established part of the doctor's armamentarium. Visible Light, Actinic Rays, X-ray and Radium are but different parts of a mighty spectrum coming to us from the Sun.

The Convention owes a debt of gratitude to the physicians who gave their time and their knowledge in clinics and lectures —these are the men:*

Miles J. Breuer, M. D.
W. B. Chapman, M. D.
Maurice R. Cottle, M. D.
Leo C. Donnelly, M.D.
Chas. H. Frederickson, M. D.
Dean W. Harman, M. D.
Abraham R. Hollender, M.D.
Wm. E. Howell, M. D.
D. Frank Knotts, M. D.
Disraeli W. Kobak, M. D.
Gustav Kolischer, M. D.
Ellis G. Linn, M. D.
Frederick H. Morse, M. D.
Roswell T. Pettit, M. D.
Curran Pope, M. D.
A. L. Smith, M. D.
Harry M. Thometz, M. D.
Albert F. Tyler, M. D.
Mel R. Waggoner, M. D.

That the splendid work of H. G. Fischer & Company in arranging this Convention and carrying it through, is thoroughly appreciated, has been demonstrated by the unanimous rising vote of thanks we have tendered to them.

EDWIN C. HENRY, M. D.

*To these we must add the name of Doctor Henry himself! His invaluable work as chairman contributed much to the success of the Convention. H.T.F.



Thermopenetration in Treatment of Disease of the Female Bladder

Buben, in Deutsche Medizinische Wochenschrift, reports fifty patients treated, some for gonorrheal conditions, others for cystitis, incontinence, or painful urination. In twenty the applications were intravesical; in the remainder extravesical only. In the latter an olive-shaped electrode was used in the vagina with Kelen's thermometer, the external electrode being a lead plate the size of a man's palm over the symphysis. The improvement in these was less satisfactory than by the internal method, although usually good results were obtained in this way also.

The internal electrode employed in the cases treated intravesically consisted of a metal catheter twenty centimetres long and narrowed in the middle, fitted with a cock and with a two centimetre screw tip. From the cock to the removable tip the narrower central portion is insulated with rubber-coated silk webbing. Through the metal tube the bladder may be filled with salt solution, the cock may then be closed, and the same tube serve as an electrode. The fluid is thus gradually and uniformly heated by the passage of the current, and the entire mucosa of the organ in this way receives an intensive warming. Three applications a week were given of ten to twenty minutes' duration with one-half to one ampere of current. On an average ten applications accomplished a cure. The most marked success was that obtained in juvenile enuresis.

There is no doubt in the author's mind that the heat effect of thermopenetration differs materially from that of heat applied externally. The explanation of this difference is not to be sought in the action of the electric current in thermopenetration, but in observation that, while external warmth affects only the surface tissues to a depth at most of one or two millimetres, the deeper tissues may be heated by thermopeneration to any desired temperature below the coagulation level of 50 degrees C. This heat generated in the deep tissues

is manifested not only in a hyperemic effect on the nerve endings of the arterial walls, but also by affecting other trophic nerve endings, and so, by raising the temperature of the interior of the body, a tonic effect is produced on the chemical constitution and metabolism of the region penetrated by the current.

Quartz Light Therapy in Diseases of the Ear

By LEO C. DONNELLY, M. D.
Detroit, Michigan

Ear specialists quite generally admit that Ultra Violet Rays, as well as the X-ray and frequently Electro-Therapy, are important adjuvants in the diagnosis, prognosis and consequent treatment of diseases of the ear.

The author, as an Ultra Violet Ray specialist, frequently has had cases coming in this category referred to him for treatment.

Included therein have been cases where partial deafness appeared as a symptom. Suppurating middle ear with poor prognosis, as well as operated patients, have all been seen and treated.

Let us summarize typical happenings: A patient is suspected of developing a mastoid abscess. Operative procedure, while anticipated, is not immediately resorted to. It is, therefore, entirely feasible to use our method to build up resistance and alleviate pain, both of which are certain to accrue if the Alpine Sun and Kromayer lamps are properly made use of at this time. Infection may be checked so that the necessity for operation is overcome.

Every ear surgeon knows of many cases where the mastoid process had been operated, leaving a sluggish non-healing wound. The patient is run down, worn out perhaps by long continued sepsis, and pain--in fact, altogether discouraged with daily routine of dressings which seem never to end. At this point comes a suggestion from some source that Quartz Lamps be employed. The picture now undergoes a complete change.

Very shortly sleep is more natural, toxicity decreases, appetite increases, and these results bring renewed hope to patient and friends alike.

Here, our technique is arranged so as to conduct the Ultra Violet Rays to all parts of the wound, and the necessity for first or second degree reactions is determined, and a course of general treatments prescribed dependent upon general bodily vitality indexes. Evidences of the benefit derived are indicated by a more watery discharge, generally becoming more profuse after a few treatments, while the appearance of the wound changes from its grey, sluggish, septic state to one of a more healthy nature and the prognosis is then materially altered.

A mastoid abscess is osteomyelitis of the mastoid cells. The entire body is damaged by the absorption of septic materials from the necrotic bone. Calcium metabolism is especially lowered. Increased calcium metabolism aids in curing osteomyelitis by producing new bone to wall off and, later, replace the diseased bone. The fact that quartz light therapy cures rickets, tetany, spasmophilia and is the best adjuvant in the treatment of tubercular and other forms of osteomyelitis is now well known by physicians who read the modern medical literature. These beneficial results are partially brought about by the quartz light stimulation of calcium and phosphorus metabolism. This stimulation is further increased by spraying the patient with a three per cent solution of calcium chloride during the treatment.

The type of applicators used, postures assumed for the proper manipulation of same, at times supplemented by some irrigating system to be employed, are all necessarily determined by individual factors and environment present or lacking, in each case.

It is important to note that probably all cases of this type are benefited, some being cured, and manifestly a medium capable of approximating these results in the hands of any intelligent physician is sufficiently valuable to be made universally serviceable.

Tonsil Fulguration Better Than Tonsil Operation

By THOMAS M. STEWART, M. D.

The writer claims success in ninety per cent of cases treated by fulguration which is equal to the degree of success claimed for the cutting operation. This method together with one or two X-ray treatments using a 7 to 9 inch spark gap leaves nothing to be desired. Most tonsil operators are unaware of the wide range of unsatisfactory results after the cutting operations and a review of the literature reveals a large number of fatalities following such operations.

Davis (Journal A. M. A., April 22, 1922) in the examination of 7500 school children during a period of two years, says: "I was impressed with the large number of children showing pronounced enlargement of the glands of the neck and poor nose breathing, although their adenoids and tonsils had been removed." His conclusions are:

1. The incidence of heart disease in children referred for tonsil operation is very small.

2. The glands of the neck enlarge as often after as before removal.

3. There is more complete relief from symptoms when removal is done at from 7 to 10 years of age.

4. Early removal gives mechanical relief for a short time, but the original cause of the growths, whatever it may be, is present and active until a much later period.

Abstracting from a large number of articles by prominent men the author concludes that the end results in tonsil operations do not guarantee a disappearance of the symptoms and infections traceable to the tonsils. Neither do tonsil operations prevent the recurrence of the symptoms and infections. It is logical therefore to use other methods to reduce large tonsils in size and render them more healthful. Tonsil fulguration and its modifications meets the requirements, and does not carry with it the attendant dangers of the cutting operations.

The advantages of high frequency currents by means of fulguration, electro-coagulation, dessication and diathermy, are:

1. Bloodless work. The danger of hemorrhage is abolished.
2. The danger of infection due to local anesthesia and of death due to the general anesthetic is also abolished.
3. The diseased parts undergo sterilization because the current used is germicidal.
4. The singing and speaking voices are in no way impaired.

Technic

The first step is the application of the local anesthetic to the tonsil along the borders of the pillars and on the upper pole. For this purpose a one per cent cocaine solution may be used. This is painted on by cotton swabs. Solutions of procaine or novocaine may also be used. Adhesions must be separated and tonsillar crypts flushed out. In applying the high frequency technic, it is best to consider three types of tonsils:

1. The hard tonsil.
2. The disintegrating tonsil.
3. The soft inflamed tonsil.

The Hard Tonsil Technic

This tonsil because of poor circulation and low grade tissue changes responds to heat. The D'Arsonval high frequency current is of lower voltage than the Tesla, consequently it has greater amperage. The greater quantity of current is needed in diathermy and electrocoagulation. The pole or terminal of the D'Arsonval coil is attached to a probe, cotton wrapped, soaked in epsom salt solution, and the probe is fastened into a Cook fulguration handle. The other terminal is attached to the auto-condensation chair or the ordinary auto-condensation handle which the patient then holds. The cotton wound probe is pressed against the tonsil and the current gradually turned on until it is hot and then it is moved over the surface of the tonsil, into the crypts and space around the tonsil. All manipulations are gently done. The application to each tonsil consumes

three to five minutes of time. The after-soreness is slight and disappears in a day, at most two days, and then another treatment is in order. It is better to perform the operation four or five times than to over-treat at one sitting.

The Disintegrating Tonsil Technic

Use D'Arsonval current 500 to 800 milliamperes, controlled by foot switch. Here good local anesthesia is usually needed. Mould a piece of block tin or metal mesh cloth, six inches square will do, to shoulder and back. Hold it in place with sand bag or bandage so that perfect contact is obtained. One terminal is connected to this as the indifferent electrode. The other terminal is connected to Cook's handle which carries a long needle. Insert needle into tonsil one-eighth to one-quarter of an inch. Turn current on for an instant, the part will turn white if coagulation is perfect, if not, repeat. Treat several areas, the whole tonsil can be treated at one sitting if desired, after one has had the experience by which to judge results and estimate reactions. It is best to do a little at first sitting and give two or three treatments rather than to do too much at one time. Two week intervals may be required between treatments. With this method, some after-pain may ensue. Cold epsom salt compresses will help nicely. One-half teaspoonful of epsom salt to cup of water. Use part as gargle.

The Soft Tonsil Technic

Less heat is needed for treatment of this type of tonsil, because the vessels are already dilated. The D'Arsonval current would only dilate them to a greater degree. Less current and more voltage is needed and this is the character of the current obtained from the Tesla winding or Oudin resonator. The application of this current is highly germicidal and will contract the tonsil down to normal size. The auto-condensation chair is connected to one Tesla terminal. The wooden or glass tongue depressor of the author's design is used, as metal ones are contra-indicated. Then with a probe insulated in its middle portion, draw the current out of tonsil at different points until it is slightly blanched. The current is felt in the

operator's fingers, he being the partial ground. The fingers not holding the tongue depressor, touch the patient's face, and by using one or more fingers, the current may be controlled. The after-soreness will disappear in three or four days.

The Unipolar Current for Relapses

If a tonsil needs a little more treatment at a later date after dismissal, the Oudin or unipolar current is a simple technic and effective. After two or three swabs of the local anesthetic, use insulated electrode with about one-eighth inch spark. Each spot treated will turn white. Go around the outer edge of the tonsil.

Conclusion

By using one or more of the electro-therapeutic methods described above it is possible to treat diseased tonsils with an equal or greater degree of success than by the cutting operations, and without the dangers or bad after-effects of the latter.

(The American Physician, Vol. XXIX, August '24)

Treatment of Neuralgia with the High Frequency Current

Schurig, in Deutsche Medizinsche Wochenscrift, says that while it should be a matter of routine practice in every case of neuralgia to ascertain and treat the cause still many of the severest forms are necessarily classed as "idiopathic," in which no other origin than "taking cold" can be assigned, and these are apt to prove particularly stubborn. In all these forms the author finds high frequency a sovereign remedy, greatly superior to any other. Foremost among them he places certain cases of supraorbital neuralgia of long duration and resistant to numerous efforts at relief. Occipital neuralgia is not infrequently an associated feature. Most obstinate of all are brachial and intercostal neuralgia, but even these yield to persistent treatment.

Excellent results are obtained in sciatica, both acute and chronic. In cases so acute that the pain is well nigh unbearable,

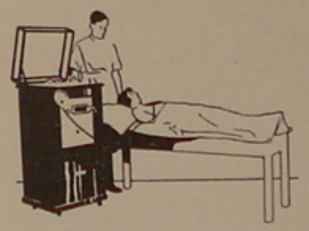
after a few sittings the patient feels better, becomes able to walk with a cane and later without one, and in twenty or thirty treatments a complete cure is effected. To accomplish this the current must be as strong as can be borne, the length of a sitting half an hour, and the treatments preferably daily. In the chronic form the same measures produce an improvement in five or six sittings, and twenty or thirty, occasionally more, afford complete relief from pain that has tormented the patient for years and decades.

In exceptional cases high frequency applications prove ineffective. Then the author resorts to the galvanic current, after the method suggested by Stanowski of Danzig in 1898, very strong and as long as can be borne, up to half an hour. Especially in sciatica has the author obtained in this way most gratifying results.

Diathermy and Angina Pectoris

By S. EDGAR BOND, B. A., M. D.

Richmond, Indiana



(Doctor Bond discusses the pathology of Angina Pectoris at some length, together with symptoms and methods of relief. He continues:)

Nitro-glycerine is the remedy par-excellence for the internist. An uncertain and dangerous operation, as yet in its incipiency, is the relief offered by the surgeon. The patient faces the alternative of a quiet life or one more attack and possible death.

Some recent experiences from other operators in this clinical field in the use of physical therapy have given me reason to hope for relief for some cases of angina pectoris. A case treated during the last year may well illustrate some possibilities in the use of diathermy or internal electrical heat as one of the future possible methods of relief or cure of this

and similar diseases. I have secured relief. Time alone will prove its permanence.

Case Report

Mrs. A., age 58, plump, complaining of attacks of pain in the chest with continual pain over cardiac area, especially noticeable in the superior cardiac aortic region near sternum. She gave a history of several attacks varying in severity from slight spasm of pain to *in extremis*. These had been relieved by an extended stay in the open plains and among the foothills of the northwest. On returning home she was again seized with attacks as formerly. She suffered great dyspnea with little relief of pain after her first attack. Physical examination and history of the case indicated a typical case of angina pectoris.

I at once suggested she place herself under my care and the use of diathermy. She began treatment October 21, 1923. She took in all twenty treatments. A small metal pad large enough to cover the cardio-aortic area was placed over the heart, and a larger electrode was placed opposite this on the posterior surface of the body. The first fifteen treatments were taken regularly every other day, and later treatments irregularly because the patient did not feel the need of them. Relief was noticeable from the first treatment. The last treatment was given February 19, 1924. For some time prior to that she was practically free from pain. She has suffered no attacks since, and considers herself cured. She is at present at work on her farm, but she has been cautioned against undue exertion. She, however, continues to perform light farm duties.

In this case I purposely withheld all treatment in the nature of drugs in order that I might test out the efficiency of diathermy. The above experience is not sufficient to herald a cure, even in this specific case, but the returns to both physician and patient have been of such a nature we feel as the time passes along that we can record for physiotherapy another triumph in the field of incurable disease.

(Journal of the American Association for Medico-Physical Research, July 15, 1924.)

Now—We Train Nurses in Practical Physiotherapy

New Reciprocal-Registry Plan Provides Skilled Assistants for Physicians

In response to a very general demand for skilled assistants, we have arranged to give a complete intensive training course in Physiotherapy to nurses and office girls.

This course will require three weeks' constant attendance at classes which will be held in our own building. A trained nurse, familiar with Physiotherapeutic apparatus and experienced in teaching, will have charge of the work. Doctors may arrange to have their nurses or office girls attend; trained nurses will find it an invaluable post-graduate course, which will give them, in three weeks, the knowledge necessary to act as skilled assistants in the use of Physiotherapeutic apparatus.

A *reciprocal-registry* system has been inaugurated, by means of which doctors may enter their applications for Fischer-trained nurses, and nurses may register for positions where such training is required. A nominal charge will be made for the course, which will cover both training and laboratory fee.

Classes for the first course will cover the period from November 24th to December 13th, inclusive. Doctors and nurses are urged to register promptly, as there is every indication that reservations covering each course will be very quickly exhausted.

Full information on request.

Doctors—Nurses—Investigate this Course!

H. G. FISCHER & COMPANY, INC.

2335 Wabansia Avenue Chicago

SPECIAL CLINICAL COURSE IN X-RAY and PHYSIO-THERAPY

Monday December 1st, 1924—Omaha, Neb.

The fourth of a series of ten clinical courses sponsored by the Magnuson X-ray Co. for the purpose of further educating their customers in the uses of these modern therapeutic agents. These meetings are conducted by physicians of the highest standing who have had many years' experience in this work and they deal with the practical side of the question.

PROGRAM

9:00 to 12:00 a. m.—Practical Clinic at Lord Lister Hospital.

2:00 to 5:00 p. m.—Lectures and discussions by:

B. H. Sherman, M. D., Dexter, Ia., Chairman.
Curran Pope, M. D., Louisville, Ky.
G. W. Kauffman, D.D.S., Des Moines, Ia.
Sanford Withers, M. D., Denver, Colo.
T. B. Lacey, M. D., Glenwood, Ia.

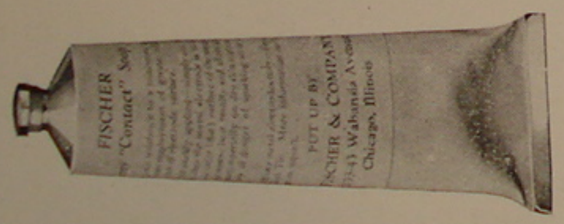
6:00 p. m.—Banquet at University Club.

The Louis Gregory Cole G-I films will be shown after the banquet.

You are invited to bring any interesting clinical cases to Lord Lister Hospital—any of them operated during the clinic will be hospitalized without charge.

NO FEE IS CHARGED FOR THIS COURSE

Diathermy Soap Lather Paste



Have you tried our Diathermy Soap Lather Paste, put up in handy collapsible tubes? Convenient, always ready and very reasonable in price—Catalog No. 875—tube 35c.

Physiotherapy Treatment of Bone and Joint Injuries

R. W. FOUTS, M. D.
Omaha Clinic, Omaha, Neb.

The treatment of any bone or joint injury will depend in a great measure upon the length of time that has elapsed between the receipt of the injury and instituting treatment. . . . .

In a case of injury in the region of the joint, for example, the ankle, which is a so-called bruise or sprain, what particular thing is responsible for the disability?

The pain, of course; but why so much excruciating pain when we may have only a slight tearing or laceration of the soft parts in this region? We are all aware that if we get but little swelling, only a moderate or trifling amount of pain will be experienced, and our conclusion is that the injury was only slight because there was but little swelling and pain. The seriousness of the original injury is usually gauged by the amount of pain and swelling. This, however, is fallacious. . . .

The difference is in the amount of fluid poured out in the tissues in nature's effort to combat or limit the extension of the irritation. If nature is generous or over-enthusiastic, as is sometimes the case, and an excess of serum is poured out, resulting in an extensive edema, a proportionate swelling occurs with its consequent pain and disability. The edema of itself produces additional injury by laceration of the muscle sheaths and traumatizing the soft tissues. . . . .

From the foregoing it is evident that treatment should be instituted as soon as possible following the injury, before the usual edema and swelling occur. However, these conditions are no barrier to or contraindication for treatment, but all agree that "an ounce of prevention is worth a pound of cure," and that it would be better to prevent the edema, swelling and pain, rather than wait till these symptoms are present and then attempt to relieve them.

Given a case of severe sprain of the ankle, with immediate extensive swelling and consequent pain, how shall we proceed?

First, a thorough examination which can be made only with the X-ray. A fluoroscopic examination will not suffice. Pictures must be taken in both planes, or better still, if taken stereoscopically.

Fractures will be detected many times with this kind of examination that would otherwise be overlooked.

The presence of a small fracture makes no difference so far as treatment is concerned, but it is a mighty good thing for the physician to know, particularly, if for any reason the case should pass out of his hands and the patient later be appraised of the fact that he had a broken leg.

Our effort in the treatment of a case of this kind is toward the relief of pain, and we do this by relieving or preventing the one thing that is causing the pain—the edema. This is accomplished by the use of diathermy after the following technic:

If the pain is not so great that the foot cannot hang down, it is placed in a basin of salt water and a combination of the cuff and salt water electrode method is employed; the cuff being placed well above the ankle on the calf of the leg, care being taken that the cuff is only tight enough to insure contact and it must be loosened and reapplied from time to time during the course of treatment, which should last thirty minutes to an hour. If the cuff is not loosened it will become a constriction and an impediment to the return circulation within a few minutes after the treatment is begun. The electrodes may be applied laterally if so desired, but the combination method, if it can be employed, seems better. The greatest amount of heat is produced at the point where it is most needed, and the efferent vessels higher up the leg are dilated, favoring the return flow of the lymph.

Another factor which contributes to the pain in a great measure is the spasm of the muscles. The sedative action of diathermy relieves this by relaxing the muscle spasm. The efferent lymph channels are opened and edema and swelling are prevented if treatment is instituted early, or is quite promptly disposed of if present. During the treatment and for a

few minutes following, gentle massage from below upward will materially assist in the process.

After treatment, the limb is covered with a thin layer of cotton, an extra layer being placed below the malleoli, and an elastic bandage applied from the toes to the calf of the leg. The limb is kept elevated and in six hours the treatment is repeated.

With the edema and swelling eliminated, the pain is reduced to a minimum and is of small consequence.

With the edema and swelling held in check for 36 or 48 hours the ankle may be strapped with adhesive tape after the usual fashion and the patient walks with but little pain or inconvenience. . . . .

What has been said about treatment of sprains, applies equally well in the treatment of fractures, providing the fracture is of such a nature as to admit of this form of treatment. . . . .

For illustration, let us take a fracture of the forearm. After the fragments have been properly reduced, our efforts should be directed toward preventing edema and swelling.

If the injury is such that it may be treated in this manner, diathermy may be given by the application of metal splints applied directly to the forearm extending well up to the elbow. After a thirty to forty-five minute treatment, the muscle spasm is relieved, the efferent channels are opened and edema and swelling reduced to a minimum. With these conditions relieved the pain is of small consequence. The part is kept continually elevated during the treatment and for 36 to 48 hours following. Treatment may be repeated three or four times during this period, after which a plaster cast or whatever form of splint desired may be applied and the patient become ambulatory.

This treatment has to its credit, not only lessened pain during the first few days, but the distinct advantage of eliminating the additional trauma produced by the edema and the resulting fibrosis of the soft tissues after healing has taken place.

We have many times been impressed by the conditions often encountered upon removing a cast or splints after four to six

weeks: The flabby atrophied muscles in some cases, while in others the partial loss of function, due to fibrosis of the muscles, and the difficulty encountered in restoring this function. . . . .

This condition may be overcome or prevented if proper treatment is instituted. The muscular contractions elicited by the early electrical stimulation enable the muscles and tendons to free themselves from the intra- and peri-muscular adhesions that are in the process of formation, thereby preventing the usual disability frequently present in these cases. The auto-muscular or cellular massage has a favorable influence upon the edema by dispersing the effused lymph.

This procedure may be carried out by utilizing the faradic current with a mechanical surge, so controlled that we may begin the treatment with very light stimulation and contractions increasing in strength as the case progresses.

Treatment may begin three or four days following the injury and be carried on without disturbing the splints by making application over the motor points higher up the limb. If bipolar contact is desired, this may be done by means of a water soaked electrode applied to the hand; in this way fibrosis and muscular atrophy are eliminated.

In the cases seen several weeks or months after the injury where firm fibrosis or ankylosis has taken place, the foregoing measures are supplemented with X-ray and manual manipulation. These are the cases that demand an unlimited amount of patience and perseverance. Here massage and manipulation play a great part and the results obtained will depend upon the judicious administration of these measures.

A preliminary treatment of diathermy materially assists by inducing a relaxation of the parts. We believe the X-ray to be the best solvent known for fibrosed tissues. Its action upon scar tissue is too well known to necessitate further discussion. It is employed in small doses, one-third of an erythema dose, once a week.

In addition to massage and manipulation, the faradic surge is employed, as it affords a very convenient and efficient mechanical means of exercise and is of distinct value.

Summary

1. Diathermy is of value in bone and joint injuries and should be used early. It relieves muscle spasm, prevents edema and lessens pain.

2. By controlling edema and swelling, further traumatizing of tissue and the resulting fibrosis is prevented.

3. Fibrosis of soft tissues may be prevented by early employment of electrical stimulation. If continued and increased in strength will prevent atrophy of the muscles.

4. In cases of long standing with fibrosis and ankylosis diathermy is of value, preliminary to massage and manipulation.

5. Small doses of X-ray assist in the absorption of scar tissue.

6. Massage and manipulation consistently employed is of greatest value in cases of old standing.

The value of physiotherapeutic measures is not understood or appreciated by the vast majority of physicians, and for this reason is not regarded with favor.

However, it has distinct value and is entitled to a place in medicine. Positive proof obtained by these measures merits a conscientious consideration from every physician interested in doing better work.

(Read before the Western Electrotherapeutic Association Kansas City, April 17, 1924)

THANKSGIVING

For peace and plenty; for national prosperity beyond the dreams of less favored countries; for the kindness of our fellowman; for the rich heritage of knowledge and skill that is available today in the alleviation of human suffering; for the wonders of this age which are at our beck and call on land and sea and in the air; for countless advantages which were unknown to the founders of this Feast, let us be thankful.

The Waggoner Physiotherapeutic Lecture Courses and Clinics

By Mel R. Waggoner, M. D., Cedar Rapids, Iowa

Classes for the Coming Season Follow:

Charlotte, North Carolina - - - - (Charlotte Hotel)	**November 10th to 15th**
New York, New York - - - - - - - (Hotel Pennsylvania)	**November 17th to 22nd**
Philadelphia, Pennsylvania - - - - (Sylvania Hotel)	**November 24th to 29th**
Montreal, Quebec - - - - - - - - (Mount Royal Hotel)	**December 8th to 13th**
***Detroit, Michigan** - - - - - - - - (Wolverine Hotel)	**December 15th to 20th**
Chicago, Illinois - - - - - - - - - (Auditorium Hotel)	**January 5th to 10th**
Los Angeles, California - - - - - - - (Lecture Hall, Professional Building)	**January 26th to 31st**
San Diego, California - - - - - - - - (Grant Hotel)	**February 2nd to 4th**
San Francisco, California - - - - (St. Francis Hotel)	**February 9th to 14th**
Seattle, Washington - - - - - - (Olympic Hotel)	**February 16th to 21st**

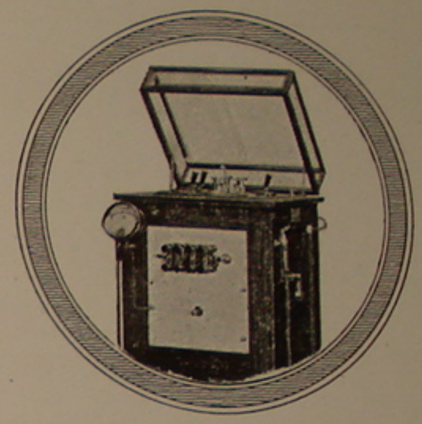
*Those who planned to attend the Cleveland class (which has been canceled) are advised to attend the Detroit class instead.

Personally conducted Courses, Clinics, Lectures

For Details, Fee, etc., etc., write the Secretary of the Waggoner Lecture Courses, at 1664 N. Claremont Ave., Chicago, Illinois.

(Watch for announcements in Fischer's Magazine)

Style FO



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Diathermy Apparatus

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2335 Wabansia Avenue Chicago

A PAGE OF FUN

Jack: "Mrs. Reilly wants to know how long babies should be nursed."

Cass: "Tell her the same as short ones."

□ □ □

At a golf club one Sunday morning a member turned up late. Asked why, he said it was really a toss-up whether he should come there that morning or go to church.

"And I had to toss up fifteen times," he added.

□ □ □

She: "Since I inherited that property I've had three proposals."

He: "Oh, for the land's sake!"

□ □ □

"What precautions do you take against microbes?"

"First, I boil the water—"

"Yes, and then?"

"Then I sterilize it—"

"That's right, and then?"

"I drink nothing but beer."

He (after a long argument): "So you see, dear, you misjudged in saying that I was making love to that other girl just because we were out on the porch."

She: "All right. I believe you. Now wipe that eyebrow off your cheek and we'll go home."

□ □ □

The way to kill some people is to ignore them; the way to ignore others is to kill them.

□ □ □

Poor Fish (after breathless minutes): "Dearest, am I the first man that ever held you in his arms?"

Fair Fisher: "Yes, of course! Why do you men always ask that the first thing?"

□ □ □

Modern Girl (telephoning home at 3 a. m.): "Don't worry about me, Mother. I'm all right. I'm in jail."



THE ABSENT MINDED WAITER" COURTESY OF JUDGE

FOR THEY CAN CONQUER WHO BELIEVE THEY CAN

FISCHER'S MAGAZINE



THIS BOOK
IS THE PROPERTY OF
H. G. FISCHER & CO., Inc.

363

DECEMBER, 1924

SHOW ME A MAN WHO MAKES NO MISTAKES AND I WILL SHOW YOU A MAN WHO DOESN'T DO THINGS.
— THEODORE ROOSEVELT

Fischer's Magazine

Devoted to the advancement of the Science of Electro-Physio-Therapy and to the interests of those earnest and enlightened medical men who are practicing it.

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H. G. Fischer & Co., Inc., 2333-43 Wabansia Ave., Chicago, Ill.

Vol. III December, 1924 No. 1

Christmas

Let us take a little trip down Memory's Lane.

At the end of the lane, we are back in an old fashioned home. It is Christmas Eve, and all outdoors is covered with a soft, white mask of new fallen snow. We have been put to bed early, for we are only a few years old, and little folks must be out of the way when Santa comes. Under the warm blankets we shiver with excitement as we listen for the muffled patter of reindeer hoofs and the silvery jingle of sleighbells.

Presently, however, in the midst of our vigil, the Sandman has his way with us and we fall asleep. We are startled into a glad wakefulness by mother's voice—or father's—"Santa Claus has been here; come and see what he left for you!" We come, round eyed with expectancy.

What a vision! A corner of fairyland, transplanted into the familiar room. Candles gleam softly against the dusky green of a tall Christmas tree, their light reflected in twinkling splendor by brilliant, colored ornaments and glittering tinsel. On the boughs and all about the tree are things straight from Santa's workshops. With a thrill of purest joy, we set about inspecting these.

Never, in after life, may we experience an hour just like that one. The nearest approach to it, perhaps, lies in the reflected joy that is ours as we stand in the background at

Christmas time while today's generation of little folks takes the place that once was ours.

May that joy, and all the pleasant merriment of Holiday Time, be yours in full measure, this coming Christmas tide.

Electrotherapy in Chronic Prostatitis

An Open Letter From

L. B. WILLIAMS, M. D., TORONTO

"Gentlemen: In Fischer's Magazine, October Number, Page 16, 'Prostatitis,' both the enquiring and the responding doctor seem to be chafing under defeat. The former used Diathermy and 'failed to get results.' The other doctor in answering his confrere says 'where the patient does not respond satisfactorily.' Impaired prostate (chronic) is today, and unnecessarily so, one of the most serious conditions of man's maturer years. Electrotherapy and surgery in their respective schools of thought in medicine are the rostrum of therapy. The writer, who has experienced much of both, has no hesitancy in saying that in the earlier days of symptoms, Electrotherapy will remedy the patient to his satisfaction, with no thought of surgery. In the long neglected cases it will help much to make life less of a burden, whereas with surgery life is too far spent to give any assurance; it isn't a fifty-fifty chance of either living or betterment.

"In the light of what may be accomplished today with Electrotherapy, the blight of the contemplation of this 'late stage' lies on the doorstep of the medical profession.

"I think the trouble with the first doctor is that he 'put all his eggs in one basket.' He used only diathermy. Manufacturers are partly to blame for this. Their booklet literature, naturally, refers only to that which their outfit produces. The writer's treatment of chronic prostate trouble may be illustrated by a simple analogy. The farmer, to renew an old, red, hardened, muddy martingale of his harness, washes it off, puts it in an oven under a prolonged gentle heat, then soaks it with oil, and when he realizes that thorough penetration of the oil

is effected, he begins to manipulate the strap, or otherwise a type of massage. These respective maneuvers have their sequence as well as their need. The chronic prostate patient experiences constitutional nervousness, sluggish abdomen, generally congested pelvic tissue, contracted unhealthy bladder, lethargic rectum, probably piles, pelvic motor nerve impairment, all apart from the individual indiosyncrasy.

"After the bowels are flushed, I first start the abdomen towards better tone with Diathermy followed by surging Sinusoidal. Rapid Sinusoidal treatment to lower spinal nerve plexuses. This type of treatment clears the prostatic environment of stasis, and is imperative. You must have favorable surroundings. Diathermy with metal mesh plate to whole perineum working against a bifurcated cord to plates, one over bladder and the other over sacral region; at times disconnect one bifurcated cord and again the other, which will regionally concentrate. This one change is only typical of many innovations for which your experience must be on the alert.

"Now for prostatic massage, the deep, prolonged, culminating surge, special applicator in rectum, absolutely against prostate; and I have apparatus for making sure of maintaining what I set. The current won't go through an old, petrified prostate if it can get easier media. Here is where haphazard procedure fails.

"The type of surge makes all the difference. I use here a type of machine that, in its pull, lacks polarity effect, because with some of my Sinusoidal wave outfits, before I could effect sufficient pull to suit me, the patient would be indicating a feeling of bowel evacuation necessity. The indifferent pad I place over the bladder to improve its condition indirectly. Occasionally I use an insulated flexible olive tipped electrode in the penis, operating just where you feel the insertion offers resistance, using the same surging current. Sometimes, with considerable urethral narrowing, I employ galvanism, positive pole if tenderness and tendency of slight manipulation to make a little showing of blood; or negative pole if I desire some softening. The surge I use is slow, starting from zero, gradually reaching its zenith of pull, which wringing effect is pro-

longed, for obvious reasons, before retiring. I use sponge disc electrode with surge throughout urethral tract posteriorly outside penis. Diathermy with a rectal electrode is used in prolonged treatments and not too heavy for its general metabolic effect.

"You have to deal with enlarged prostate, nerve force exhaustion, constricted urethra, atrophied irritable bladder, pelvic congestion and stasis; and in the wake of it all is general nervousness with its by-products. How far reaching are your results, of course, has many determining factors, but you will have very beneficial effects with which, under the circumstances, both doctor and patient will be pleased; so much so that the first doctor will not enquire about his failure nor the second doctor acknowledge, 'Yea—even so.'"

A Brief Outline of the
Course in Physiotherapy
For Physicians' Office Assistants

Thorough training in the use of Physiotherapeutic apparatus, which will provide skilled assistants for physicians, is assured through this comprehensive course.

The course will be highly intensive, and covers Physical Therapeutics thoroughly, including all branches of electrotherapy and massage. Three weeks constant attendance is required. Each day is divided into six one-hour periods, starting at 9.00 A. M. and ending at 5.00 P. M., with a two-hour luncheon recess. The work for each period has been very carefully and completely outlined, to the end that every minute shall count and no time be wasted in aimless discussion. A trained nurse, familiar with Physiotherapeutic apparatus and experienced in teaching, has charge of the work.

Following is a brief outline of the subjects covered in the course:

Outline

1. *General Office Procedure*—Including specific consideration of general nursing practice in connection with Physiotherapy. Also care of equipment.

2. *Anatomy*—Will be reviewed briefly in connection with the instruction in massage.
3. *Massage*—Swedish method for massage of body will be given, including active and passive exercises.
4. *High Frequency Currents*—Will be considered as to their source and application, as well as the proper manipulation of the machine. Actual practice in applying electrodes and administering the treatments will be included, giving Medical Diathermy according to the various technics; also Auto-Condensation and Vacuum and Non-Vacuum Tube applications.
5. *The Galvanic, Sinusoidal and Interrupted Galvanic Currents*—Will be considered as to sources, types of currents, machines for obtaining currents, manipulation of machines and application of electrodes. Particular attention will be given to the Morse Treatment for Intestinal Stasis.
6. *Phototherapy*—Including both the Heat Rays and Actinic Rays, will be considered both as to technic of application and as to physiological effects.
7. *Inspection Trips*—Through the Fischer factory, to see and understand the interior construction of equipment, and to various clinics in the city, will be made from time to time.

Reciprocal Registry System

Under our *Reciprocal-Registry* system, doctors may enter their applications for Fischer-trained nurses, and nurses may register for positions where such training is required. A nominal charge is made for the course, covering both training and laboratory fee.

First classes started November 24, and extend through until December 13. The second series will begin at 9.00 A. M. January 5 and close on January 24. Prompt registration for this second series is urged, as reservations undoubtedly will be exhausted early.

Doctors and nurses desiring further information are requested to communicate with Mr. H. T. Fischer, either by letter or by telephoning Armitage 0322.

Diathermia and the Physiological Treatment of Cancer

By ALBERT C. GEYSER, M. D.
New York City

In a paper read before the ninth annual convention of the American Association for Medico-Physical Research, and printed in the Journal of that Association, Dr. Geyser discussed at some length the nature and causes of cancer. Of special interest to our readers are the following excerpts from this article which deal with the use of diathermia. We quote verbatim:

Some of the Research Findings

In the third report of the Imperial Cancer Committee (1908) Haalan, at the suggestion of Ehrlich, undertook some tests with heat upon cancer tissue intended for inoculation. The result was that when such tissue was heated for thirty minutes to 111.2 F., the tissue was no longer viable when transplanted. . . . . Jenson repeated the experiment and, in the annual report of the New York Cancer Laboratory, 1910, shows that all cancer cells die when heated to 116.6 F. for thirty minutes; Leob found that sarcoma cells died when exposed to a temperature of 113° F. for thirty minutes; Vedal showed that nearly all tumor growth was arrested with a continuous temperature of 104° F.; Lambert, in 1912, pointed out the relationship that exists between the degree of heat and the time of action on malignant as well as on normal cells. . . . .

Heat Electrically Applied

Electric coagulation, cathophoric sterilization, fulguration and cauterization are methods wherein heat is used to a degree of complete destruction of malignant cells in situ. I shall omit the description of these because they are in reality akin to surgery; they attempt to kill, destroy and remove the offending cells from the system in toto.

Physiological therapy does not consider the histological nor the anatomical formation or location of malignant growths;

it endeavors to deal *only and entirely with the physiology* of such cells.

It has clearly been shown that heat of a certain degree destroyed tumor cells, yet in no way affected normal tissue. It is also a well known fact that dry or moist heat applied to the living body can only penetrate three to five millimeters. All of the good effects observed from the application of moist or dry heat is due to the gradual heating of the entire blood volume and to the reflex effects of local heating.

In the diathermic phase of a high frequency current we have an agent that heats the tissues *through and through* without practically exerting any influence upon the outside. A malignant growth is of a much firmer, harder consistency and with a lessened circulation than normal tissue; it is therefore especially adapted to the *storing* and *retaining* of heat, when this is artificially supplied. In fact the malignant mass is *always* of a higher temperature *after applying diathermia* than the surrounding normal tissue. Under these circumstances it is easy to maintain a tissue or an organ in a state of elevated temperature for hours.

From practical experience it has been shown that when the entire malignant growth has been subjected to an increase of *three degrees* of temperature for sixty minutes daily its *physiology* is markedly interfered with. Cachexia is prevented or removed; the tumor mass undergoes a retrograde metamorphosis, individual nodules soften and they become smaller and finally disappear; pain ceases entirely; discharges lessen and lose their offensive odor. . . . .

Technic of Diathermia

Reference has been previously made to the thermic effects upon cancer cells. In all of those tests the cells had been *removed* from the patient for the purpose of transplantation. It was then shown that these cells, after the application of certain degrees of heat to them were no longer viable; therefore did not produce cancer upon the experimental animal. It is not our desire to remove cells and then destroy them. We intend to *leave the cells in situ*, but by the application of an

electric current cause them to become heated to exactly the *same degree* of temperature as the experimented cells. It is not our object to interfere with their anatomy, but we *do want to change their physiology*. To do this it is necessary to include the entire tumor between the two electrodes of a high-frequency current. With breast or superficially situated skin cancers this is quite simple. With intra-uterine and rectal cancers, while a little more complicated and uncertain, nevertheless practical results may be achieved in eighty per cent of the cases.

In the case of breast cancers, a suitable electrode is applied directly over the lesion, the other electrode containing *at least* four times the surface area, is placed directly opposite upon the dorsum of the patient. The current is turned on to the point of tolerance, which is usually about fifty milliamperes to each square inch of the anterior electrode. If the skin overlying the growth is as yet intact, the reading may go as high as one hundred milliamperes to the square inch. From forty-five to sixty minutes should be consumed for each treatment, repeated daily or at least on alternate days.

When the growth is situated in the cervix uteri, or rectum, a suitably shaped electrode is placed in position, then a larger anterior and posterior electrode are placed on the skin of the abdomen and back of the patient, these two large electrodes are short circuited and led to one binding post of the high-frequency machine. The intra-uterine as well as the rectal cavity will bear temperatures considerably higher than the external skin. It is not uncommon to use 200-300 or even 1,000 milliamperes to the square inch of area in these mucus membrane applications. The treatments should be given daily or at least on alternate days for at least two months, then once per week for an indefinite period.

Let it be thoroughly understood that the application of diathermia *does not necessarily* remove the growth but it *does interfere* with the physiology of the cancer cells in such a manner that the previously present cachexia disappears, there is a complete cessation of pain, all lymphatic enlargements subside,

the patient gains weight and appears to all intents and purposes normal.

After Diathermia has been used for a sufficient length of time, and these constitutional changes have been brought about, there is no reason why the growth should not be removed surgically or otherwise, because practically all chances of recurrence have been forestalled. The growth which was previously malignant, may now be looked upon as a benign tumor and dealt with accordingly.

Use of the Cervical Thermophore

The following information, contained in a letter written by Budd C. Corbus, M. D., of Chicago, in answer to a query from Dr. E. L. Hergert of Brooklyn, N. Y., may well prove of value to many or our readers.

"Concerning the Cervical Thermophore, it is anchored to the set screw of the bivalve speculum, either by a piece of wire or string. There is no danger of short circuiting if the electrode is firmly fixed within the cervix. If one has a ring stand holder or any such device, it can be substituted for the method described.

"Answering your queries: (1)—The Leucorrhoeal discharges that remain after thermophore treatment are best treated with topical applications of Mercurochrome or a continuation of Hot Vaginal Sitz Baths with the vaginal speculum.

"(2)—Non-Gonorrhoeal Endocervicitis is always greatly improved with Diathermy but barring laceration from childbirth is always systemic in origin and calls for systemic treatment. Always put the whole tip of the thermophore into the cervix or you will have a short circuit.

"(4)—The black cap that comes with the instrument is used when the thermophore is introduced in the male. The long rubber cap is substituted for the short one, then you have the long electrode for the male urethra. The reasons for the thread are obvious. If the cervix is too small and it is impossible to introduce the thermophore it would be better to use some other treatment. Do not mutiliate your patient to use the thermophore.

The Waggoner Physiotherapeutic Lecture Courses and Clinics

By Mel R. Waggoner, M. D., Cedar Rapids, Iowa

Widespread and rapidly growing interest in these classes and clinics is indicated by the increased attendance that has marked the assembly of each succeeding class. Doctors who are keeping pace with the development of physiotherapy find them a valuable source of new information and up-to-date practices.

Classes for the Coming Season Follow:

Detroit, Michigan - - - - - - - - - December 15th to 20th
(Wolverine Hotel)

***Cleveland, Ohio - - - - - - - - - - January 5th to 10th**
(Hotel Winton)

Los Angeles, California - - - - - - - January 26th to 31st
(Lecture Hall, Professional Building)

San Diego, California - - - - - - - - February 2nd to 4th
(Grant Hotel)

San Francisco, California - - - - - February 9th to 14th
(St. Francis Hotel)

Seattle, Washington - - - - - - - February 16th to 21st
(Olympic Hotel)

*NOTE: In response to many requests, the Cleveland class, which had been canceled, has been reinstated as indicated above.

Personally conducted Courses, Clinics, Lectures

For Details, Fee, etc., etc., write the
Secretary of the Waggoner Lecture Courses, at
1664 N. Claremont Ave., Chicago, Illinois.

(Watch for announcements in Fischer's Magazine)

Diathermy in Urology

WALTHER, H. W. E., M. D., and PEACOCK, C. L., M. D.
(New Orleans)

Medical diathermy is subdivided into *sedative* and *stimulative*. Sedative diathermy produces an active hyperemia, stimulates phagocytosis and revitalizes tissue cells.

The authors report on 73 urologic cases treated by diathermy, either medical or surgical, during the year ending June 1, 1924. There were 11 cases of bladder tumors, 15 lesions of the external genitals (including chancroid, granuloma and warts), 3 cases of gonococcal endocervicitis, 25 cases of gonococcal epididymitis, 1 case of orchitis complicating mumps and 3 cases of gonococcal arthritis.

Negative results in prostate gland cases are attributed to the fact that a portable unit only has been used in this work, which does not deliver sufficient voltage to carry through the dense prostate structures.

Authors think that for treating primary papilloma of the bladder, surgical diathermy has no equal. It offers as much relief to malignant conditions in this viscus as any other one agent. In the latter cases, by means of the open operation, growths can be thoroughly cooked out with surgical diathermy.

Of the 11 bladder tumors treated 4 were so far advanced that cystotomy, surgical diathermy and radium were used principally to check hemorrhage and pain. The other 7 cases responded promptly to diathermy, but they must be kept under surveillance for some years.

Tumors of the urethra in the male can be treated as expeditiously with surgical diathermy (i.e., electro-coagulation) through the McCarthy Cysto-urethroscope as can tumors of the bladder through a cystoscope. Diathermy has been found superior to any other means of destroying urethral papilloma in women.

In the 15 lesions of the external genitals, the authors feel convinced that the procedure materially shortened the time

of convalescence; and particularly recommend it on account of its cleanliness. Diathermy is specific for chancroid.

Although only 3 cases of endocervicitis were treated, the results have been very encouraging. They have used Corbus and O'Connor's thermophore, but varied the technic to the extent of alternating the indifferent electrode between the supapubic region and the back, so as to treat effectively both anterior and posterior cervical lips.

Sedative diathermy is the most satisfactory of all methods devised for the treatment of epididymitis. One treatment suffices in the majority of cases.

Points in the technic of this are: insulated table on which patient lies; *no air space* between electrode and skin; scrotum supported by insulated shelf; piece of mesh used for active electrode large enough to cover affected organ; patient keeps perfectly still; current starts at 50 milliamperes for one minute and is gradually increased to 1500 milliamperes, the increase being about 50 every 30 seconds.

Most patients will only tolerate up to 750 milliamperes. When the limit is reached it is kept up steady for about 20 minutes.

The results in the 3 cases of gonococcal arthritis were sufficiently striking to warrant their inclusion in this report.

Convention of P. C. P. A. Is a Big Success

The Third Annual Convention of the Pacific Coast Physiotherapy Association, held at the Professional Building in Los Angeles the last week in November, was a highly successful one, according to reports from the west coast city.

Attendance broke all records, and the earnestness and enthusiasm displayed at every meeting was a splendid index of the progress that Physiotherapy has achieved in that section. As one doctor has phrased it, "We are on the right road, and a long way along that road, toward full knowledge and full use of *all* the electrical modalities that are at our disposal today."

Officers and members of the P. C. P. A. are to be congratulated, not only upon the success of their Convention but upon their progress and success as Physiotherapists.

Program for Our

Monthly Physiotherapeutic Meeting

Monday, January 12th, and Tuesday, January 13th, 1925

MILES J. BREUER, M. D., Lincoln, Nebraska.
"Physiotherapy in Internal Medicine" - - 10:00 to 11:00 A. M.

HARRY M. THOMETZ, M. D., Chicago, Illinois.
Tonsil Clinic - - - - - - - - - - - 11:00 to 12:15 M.

L. C. SAMMONS, M. D., Shelbyville, Indiana.
"Physiotherapy in General Practice" - - - 1:30 to 2:30 P. M.

ERNEST CADWELL, M. D., Chicago, Illinois
"The Business Side of a General Practitioner's Life and Physiotherapy as an Aid" - - - - - - 3:30 to 4:30 P. M.

How to Get Here:

DRIVING—Follow Washington Blvd. west to Oakley Blvd., north on Oakley to Wabansia Ave., and one block west, or

BY ELEVATED — Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont, or

BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

Doctor Breuer has kindly consented to remain over for an extra day and will be in our Lecture Room all day Tuesday, January 13th, to conduct clinics and to endeavor to assist you in solving the many and diverse problems which are constantly coming up in this particular line of medical work.

We look forward to two big instructive days and urge those who find it possible to attend to spend as much time with us as they can spare.

NO CHARGE—NO OBLIGATION

H. G. FISCHER & CO., Inc., Phone Armitage 0323
2335 Wabansia Avenue, Chicago

SPECIAL CLINICAL COURSE IN X-RAY and PHYSIO-THERAPY

Monday, January 5th, 1925—Omaha, Neb.

The fifth of a series of ten clinical courses sponsored by the Magnuson X-ray Co. for the purpose of further educating their customers in the uses of these modern therapeutic agents. These meetings are conducted by physicians of the highest standing who have had many years' experience in this work and they deal with the practical side of the question.

PROGRAM

9:00 to 12:00 a. m.—Practical Clinic at Lord Lister Hospital.

2:00 to 5:00 p. m.—Lectures and discussions by:
Leo C. Donnelly, M. D., Detroit, Mich.
Miles J. Breuer, M. D., Lincoln, Neb.
Dean W. Harman, M. D., Ames, Ia.
R. W. Fouts, M. D., Omaha, Neb.
A. L. Yocom, Jr., M. D., Chariton, Ia.
E. B. Kessler, M. D., St. Joseph, Mo.

The remainder of the week will be devoted to clinical work and instructions in practical technic, in charge of Dr. Donnelly and others.

You are invited to bring any interesting clinical cases to Lord Lister Hospital—any of them operated during the clinic will be hospitalized without charge.

NO FEE IS CHARGED FOR THIS COURSE

Is Diathermy Useful in Glaucoma? —In Epilepsy?

DR. CHAPMAN SAYS NO—AND YES

In response to an inquiry as to the value of diathermy in treatment of glaucoma and epilepsy, respectively, Dr. W. B. Chapman of Carthage, Mo., writes as follows:

"Regarding the question 'Is Diathermy Useful in Glaucoma?' It is not. Glaucoma is a mechanical condition. It is caused by a blocking back of the lymph inside the eye-ball and is marked by high intra-ocular tension. In fact, the diagnosis is made by a feeling of hardness of the eye-ball. Diathermy or any form of heat will increase the tension and aggravate the condition.

"As to the use of electrical modalities in epilepsy, I will say that they are beneficial in the majority of instances; however, if the convulsions are caused by some hereditary condition or are the result of meningitis or some similar condition, little can be done for the patient. I have recently had a couple of patients who were markedly benefited by the use of the Morse Wave Generator and galvanism. Both of these patients were afflicted with colonic stasis and were absorbing a great deal of poison from the lethargic colon. Huge doses of mineral oil and the Morse Wave Generator have straightened both of them out."

New Book on Diathermy in Genito-Urinary Diseases

"Diathermy in the Treatment of Genito-Urinary Diseases, with Especial Reference to Carcinoma," by Budd C. Corbus, M.D., F.A.C.S., and Vincent J. O'Conor, S.B., M.D., is the latest contribution to the literature of Physiotherapy—and a most valuable one.

This book has been written for the express purpose of familiarizing both specialist and general practitioner with the tremendous value of diathermy in the treatment of genito-urinary diseases in both sexes. The medical and surgical methods of its application to these diseases are given in detail.

The compilation of the volume represents more than five years of closely applied study of these methods. Both experimental and clinical results are given in detail.

A complete review of the study of various forms of heat in the treatment of cancer is given, followed by the technique for treating cancer of the penis, bladder, prostate and female urethra.

There are thirty-one original illustrations in black and white and halftone. Every procedure is graphically described.

Copies of this book may be had upon application to H. G. Fischer & Co., 2335 Wabansia Avenue, Chicago. Price, $5.00.

Thank You, Doctor!

Congratulatory messages from those who attended the Convention at Logan Square Masonic Temple in October have poured in during the past month in gratifying volume.

The majority of these kindly letters embody specific praise of some feature or features of the Convention. Many of them indicate a firm resolve to attend the next annual Physiotherapeutic Convention. Some embody constructive criticism which is heartily appreciated, and which will be valuable in the preparation of future programs. The tenor of all is, "keep up the good work."

As your communications have come in, we have answered them individually. But we want to take this opportunity to say publicly, and very sincerely, "Thank you, Doctor!"

You have given us an added incentive to make the next Convention even bigger and better.

Radiologists and Physiotherapists Meet

Interesting Program at Third Annual Session

The third annual meeting of the American College of Radiology and Physiotherapy was held at the Hotel Sherman, Chicago, November 12 to 14. During these three days, a great deal of ground was covered in lectures and discussions, and doctors who attended expressed themselves as being well satisfied that the time thus used was indeed well spent.

An intensive program, utilizing every hour of the available time, and including addresses by many well known authorities, covered the general field of Radiology and Physiotherapy. An interesting evening session included the annual banquet and the conferring of fellowship degrees.

These annual meetings provide an excellent forum for the discussion of everyday problems and new methods, and there can be no question but that their effects for good are far-reaching indeed. This magazine extends its congratulations, both to those who attended the meeting and to the management.

The Treatment of Malignancies by the Use of Surgical Diathermy and X-Ray*

A. L. YOCOM, JR., M. D.
Chariton, Iowa

The treatment of cancer whether it be medical, surgical, X-ray, radium or electrocoagulation has not reached perfection in all types and in all stages of the disease. The physician who can use any or all of the above mentioned methods when properly indicated is the one who is best fitted at the present time to fight the battle of the suffering cancer patient.

Ever since radiation was first recognized for the treatment of cancer the surgeon has referred to the radiologist the worst wrecks wrought by this dreaded condition. For years this effort on the part of the radiologists to check the ravages of the inoperable case has assisted in keeping in the background the real value of this mode of treatment. Nevertheless something had to be done for the suffering patient, and the radiotherapist, even though failure seemed the rule, continued to make improvement in technique and so, with the aid of the manufacturers of apparatus and physicists there has been a great advance in the treatment of malignancies. As a result, radiology has made more advance than any branch of medicine during the last twenty years.

When an inoperable case appears before us, the patient beyond the aid of any treatment, it makes us realize that there was a time in the beginning of this dreaded disease when satisfactory treatment would have prevented his present terrible condition, hence, we feel that the general practitioner and particularly the patient himself, carries a greater responsibility in directing the right treatment to cure these conditions.



Epithelioma near the ala of nose before and after treatment by surgical diathermy.

*Read at a meeting of the Iowa Radiological and Physiotherapy Society, Des Moines, Ia., Feb. 28, 1924.

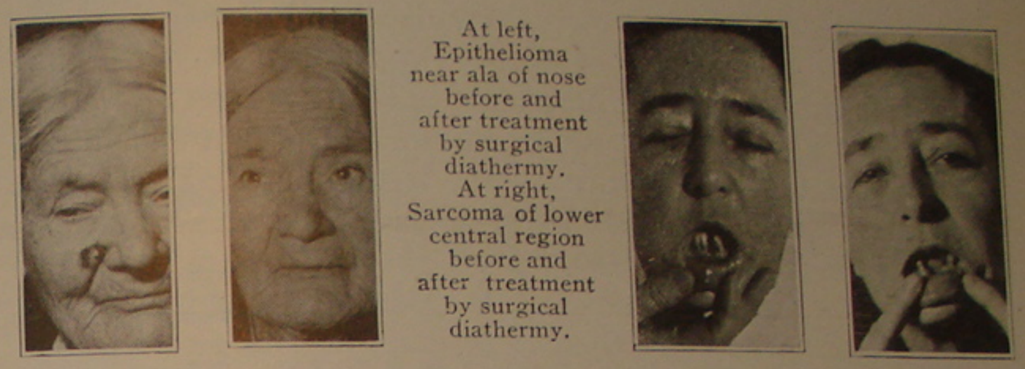
The fact that the surgeon and the radiologist has each continued to give treatment to the apparently hopeless case, while being stimulative to greater advancement, has nevertheless, driven from us many early cases that could have been cured, but the patients drifted hopelessly along waiting until too late or finding their way into the hands of the incompetent aid. Too often the average physician will pass up the small beginning lesion, which is readily removable, with a remark to the patient which leads him to think it is of no importance and can be ignored with perfect safety. The patient also is responsible many times for delay and thinks he will not bother the small growth until it begins to bother him.

Electrocoagulation and Surgical Diathermy

Electrocoagulation is the coagulation of diseased tissues by the Oudin current or one pole of the D'Arsonval current and is to be used for small superficial lesions.

Surgical diathermy is the application of high frequency currents for the destruction of tissues by the heat produced through the resistance offered by the tissue through which the current is forced, without sparking. The treatment differs from the application of the electrocautery or other applications of heat in that the heat with the latter methods is applied from without and does not have much penetrative power. The heat is generated in the tissues themselves and the temperature of the diseased area may be readily raised to a point of coagulation. Therefore it is the penetrating power of this heat which is more beneficial than the thermic cautery, which destroys only by transmitted heat.

Surgical diathermy is produced by the bipolar method of the D'Arsonval current, and should be of low voltage, high amperage and extremely high frequency. The indifferent electrode is a piece of block tin about eight inches in diameter and is strapped to the patient's back or shoulders. This electrode may be wet with a soap lather or used dry. The main object is good contact, and strapping with a good canvas binder



At left, Epithelioma near ala of nose before and after treatment by surgical diathermy. At right, Sarcoma of lower central region before and after treatment by surgical diathermy.

is all that is needed. The active electrode is smaller and either made up of a point or some other suitable electrode as to the shape and size needed.

In surgical diathermy or electrocoagulation it is necessary to use an anesthetic of some kind. For the superficial lesions which are not too large, a local anesthetic such as novocain or some other similar preparation is used. For the larger lesions we use hyoscine and morphine and find H. M. C. satisfactory. The one-fourth morphine size is given about 40 to 60 minutes before starting, and the one-half size or another full dose is given upon starting, with sufficient chloroform to produce necrosis. Ether is not satisfactory on account of the danger of explosion, especially when working about the face.

There is very little post-operative shock to surgical diathermy and on this account it is especially valuable in the aged. My oldest patient was 94 years of age and had practically all the lower lip removed and part of the upper without any shock and remained in bed only over night. There is a wonderful alleviation of pain. This is almost immediate after recovering from the anesthetic.

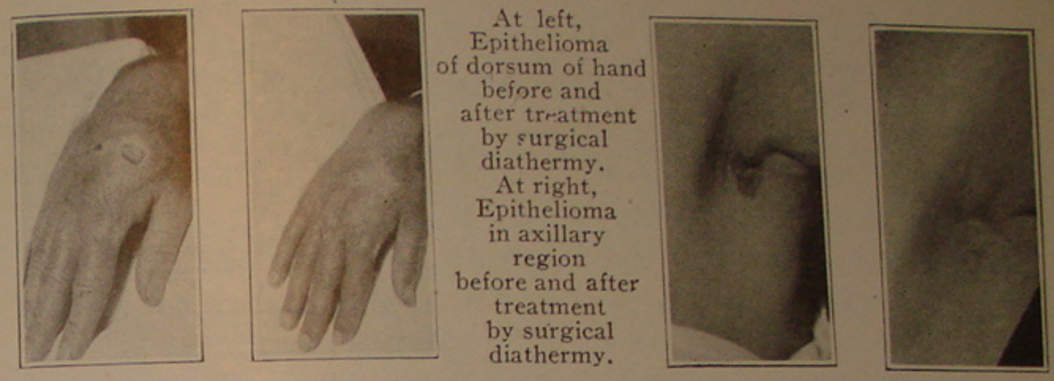
The local application of sufficient heat to the tumor mass destroys the growth. The use of a lower degree of heat to the periphery of the tumor and beyond its limits results in the inhibition of the growth of migrating cells. The dissemination of these cells throughout the organism is further prevented by the occlusion of the lymph spaces and channels, and further by the formation of scar tissue which forms a most desirable

barrier against the new growth. By diathermy the deep penetration of the high degree of heat destroys, or at least inhibits, instead of stimulating the neoplastic cells in the zone just beyond the periphery of the tumor mass. Surgical implantation of the tumor cells into healthy tissue is the unavoidable result of excision, and dissemination of metastases by the opening of lymphatics and blood vessels is not prevented. On the other hand the lymphatics and vessels are closed and metastases are not produced. By this method there is no possibility of transplanting or implanting cancer cells into new tissue. There is less likelihood of recurrence following diathermy. The dosage is accurate and, owing to the extreme heat, there is absolute sterilization of the wound and the growth is removed as a necrotic mass.

There is less tissue sacrificed than by surgery and there is ordinarily a good cosmetic result. If necessary to remove very large areas it may be necessary to do some plastic operation, especially if on the lower lip. If it were possible to destroy a tumor mass by ordinary cautery there would be some danger of the burn producing a systemic poisoning but there is no absorption from the burned area in coagulation on account of the sealed blood and lymph vessels.

The post-operative condition leads to a quick recovery and during this period the unpleasant odor is one of the disadvantages of this method of treatment. Powdered sugar used on the charred mass aids very materially in reducing the odor and I have found that boiling some water in the room with a small quantity of lysol or similar solution added to the same is a deodorizer. Another disadvantage to surgical diathermy is that there is no chance of saving blood vessels and nerves in close proximity to the disease. It is sometimes necessary to do a ligation before or after the treatment.

Any fissure or crust which lasts longer than a month should lead to the suspicion of malignancy and during this period the general practitioner has a great responsibility. Practically all cancers of the skin can be successfully treated by means of X-rays and electrocoagulation, provided they are treated early



At left, Epithelioma of dorsum of hand before and after treatment by surgical diathermy. At right, Epithelioma in axillary region before and after treatment by surgical diathermy.

and skillfully. Precancerous conditions in the skin, warts, moles, etc., are best treated by coagulation. Early local destruction of all malignancies by surgical diathermy followed by high voltage X-ray therapy of the local lesion and the draining lymphatic areas should cure all such cases. The combined treatment of surgical diathermy and X-ray therapy offers better promise of a permanent cure than either alone. Poor technique with any form of treatment will usually lead to failure and recurrent carinoma gives much less satisfactory results. It has been my practice whenever possible to radiate the area involved both before and after the surgical diathermy treatment and to also give another treatment after complete healing has taken place.

No tissue should be removed before treatment for diagnosis. It is better to have a lesion of long standing cured than to know the pathology and die from cancer.

Conclusions

1. There is immediate relief of pain. Every case upon awakening will say that he has no pain.
2. Immediate sterilization of the wound as the heat destroys the mixed infection and foul discharges.
3. Much less danger of extension and metastases than by surgery.
4. There is no shock and practically no hemorrhage.

The accompanying illustrations show the appearance of patients both before and after treatment, and are illustrative of some minor conditions which are treated by this method.

(Reprinted from The Journal of Radiology.)

Wide Choice of Modalities Available to Doctors

Away back in the primitive days of medicine, just a few remedies were depended upon for the relief of practically all diseases. Leeches and physic and a small number of simple drugs were the stock in trade of the medical man.

What a difference today! With all the vast fund of medical knowledge and modern drugs at his command, the doctor prescribes exactly those remedies which science has found most efficient for the malady he is treating. In many cases he includes in his prescription one or more special ingredients, to meet special symptoms present in that particular patient. Out of thousands of possible combinations of remedies, he chooses the one which he feels will serve best.

This is universally true today—of medicine. Yet, when we turn to Physiotherapy, what do we find? Not infrequently a condition closely approximating that which formerly existed in medical practice! One machine, perhaps only one modality, out of a field so rich in curative helps!

As a matter of fact, thanks to the enthusiasm and high endeavor of a host of earnest medical men, many distinct modalities are available today to the physiotherapeutist. Where one or two pieces of apparatus were available a few years ago, physicians of today may justifiably aim to install as many as six or eight; each with its own distinct electrotherapeutic uses, and every one a dependable and efficient mechanism, perfected far beyond the dreams of the earlier years of manufacture.

True, the doctor must always be a doctor first of all; combining wisely his physiotherapy and his medicine. Granting this, our point is, that a broad understanding of electrical modalities and comprehensive apparatus for their application is just as essential in truly modern practice as thorough knowledge of medicine.

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CHICAGO

A PAGE OF FUN

A certain professor at the University of Chicago, after a trying first-hour class said: "Some time ago my doctor told me to exercise early every morning with dumbbells. Will the class please join me tomorrow morning before breakfast?"

□ □ □

The father asked Clarence his reason for wanting to marry his daughter Lucille. The young man: "I have no reason, sir: I am in love."

□ □ □

Kitty: "What's a synonym?"
Rhoda: "It's one word that means the same as another."
Kitty: "You're crazy."
Rhoda: "Why?"
Kitty: "It's stuff they put on a bun."

□ □ □

"That makes a difference," said Willie, as he snipped off the left ear of one of the twins.

They don't name girls Prudence and Patience any more!

□ □ □

The policeman, hearing the shot, burst into the fashionable apartment. Cringing before him on the floor was the crumpled figure of a woman, weeping hysterically, a smoking pistol clutched in her trembling fingers.

"My husband! Oh, my husband!" she moaned.

"Control yourself, lady," urged the officer. "Where is the corpse?"

"Gone," sobbed the woman. "He went out through the window. I—I missed him."

□ □ □

Mother: "There were two apples in the cupboard this morning; now there's only one. How do you account for that?"

Freddie: "It was dark in the cupboard, and I didn't notice the other one."



THE LAST MINUTE XMAS SHOPPER

**"DON'T PUT THINGS OFF—
PUT THEM OVER!"**

ACTUAL FACTS & METHODS

WHICH HAVE PRODUCED SALES

H. G. FISCHER & CO., INC.

CHICAGO

This book contains confidential information and is not to be given or loaned nor is any person other than the one to whom it is sent to be allowed to read it or transcribe its contents.

You will be charged a memo charge of $25.00 and will be expected to return the book to H. G. Fischer and Company on January 30, 1927. In sending the book to you we are relying upon your honor to carry out these instructions.

H. G. FISCHER & CO., INC.

PREFACE

This collection of papers is a product of our observation of the results attained by various salesmen through the employment of what appeared to be very different methods. The fact that one man produced sales on account of certain valuable points while another man produced sales on account of entirely different points led us to wonder if it would not be profitable to all the salesmen, as well as to H. G. Fischer and Company, if an effort were made to enable the men to have at their disposal, as nearly as possible, the various methods of all the other salesmen.

In requesting these papers it was specifically set forth that the data we wanted was exactly what the name of the manual implies - "ACTUAL FACTS AND METHODS WHICH HAVE PRODUCED SALES". In so far as possible we wanted to avoid, in these papers, telling a man what to do, what a new man should do, or any advice of that kind. Our idea was to divorce the contents of these papers from theory as much as possible and just record the facts. We specifically asked that each man give us only actual facts and methods which had, in his experience, produced sales.

This collection has not been edited or changed in any material way but is being forwarded to you as we received it in reply to our questionnaire. Intimate knowledge and association with a great many of the contributors has led me to make the explanation below.

In a number of the papers you will find men disclaiming the use of any high pressure methods. By the term "high pressure" they evidently mean dishonest or untruthful methods. Knowing them as I do I must point out the fact that by disclaiming high pressure methods they do not mean that they do not employ extreme insistence on securing the order and great tenacity of purpose in continually explaining to a prospective purchaser the use of the machine, literally almost hounding him to death with repeated calls and insistence until he does give them the order.

This explanation is made on account of the fact that the most successful men on the Fischer sales force have employed work, study, and tenacity of purpose to a marked degree in attaining profitable results. Anything that might create some misunderstanding in the mind of the reader along this line would certainly defeat the purpose of this collection. Hence the explanation.

A. W. Mathis

Chicago, Ill.
July 17, 1926

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E. W. ERIKSON

Dear Mr. Mathis:

In response to your letter of April 20th, I am more than pleased to give the little technique that I have together with my ideas on sales to the boys, if I receive in return their versions of "how it should be done".

I can't imagine that there is a thing I know of that's harder for me to do than to tell a man how I sell equipment.

Then again there are men with our organization who have been with us a lot longer than I have (I've been with you actively less than a year) who have a great deal more ability than I have, and if they are willing to give me their ideas I am more than glad to give them mine.

The first thing I learned when I "offered equipment for sale" was that my competitor knew nothing about technique and neither did I. I at that time presumed that probably competitive equipment was being sold in Northern Illinois in spite of the fact that competition was weak on his ability to talk and actually demonstrate technique, so I made up my mind to learn to teach the subject of Diathermy technique rather than devote my time to studying whirlwind salesmanship.

So first as (1) I would say KNOW YOUR SUBJECT and be able to DEMONSTRATE technique, and high pressure salesmanship will take care of itself, rest assured of that.

As number (2) I always REASON and agree with a prospect rather than ARGUE, because arguments are time wasters and do not make sales.

(3) Sell him on your product BUT DON'T FORGET TO SELL HIM ON THE H.G.FISCHER COMPANY (that's where you have competition licked): (a) Educational Dept. (b) our magazine (c) monthly clinics (d) yearly convention, etc.

(4) I always admit, should the question come up, that our competitors make good equipment (but I always show him where our product is superior ---- has been out longer ---- we make more than anyone else ---- and we are conceded to be the P. T. headquarters of America, etc. etc.)

E. W. ERIKSON

(5) I always tell him that competitive salesmen (should he ask me about some man) are wonderful fellows, and I usually continue by saying that it's a shame they don't know technique. Then I show him why he should buy from me. BECAUSE I am with Fischer, have had the training, know more about technique (Why shouldn't we when almost all the big fellows have our equipment and most of the popular techniques used today have been developed on Fischer Apparatus).

Then DOCTOR remember this ---- no matter what machine you buy it doesn't make any difference, because in principle they are all practically alike, YOUR SATISFACTORY RESULTS, YOUR ABILITY TO DUPLICATE THE RESULTS YOU READ ABOUT AND YOUR INCOME depends on how well you can use your machine, and if my competitor can teach you better than I can, I want you to buy his machine. But he can't teach you better because he hasn't had the training nor is he in touch with the big men that we are because almost all the big men have Fischer equipment. We are in continual touch with them, and if you don't believe me here's a copy of our monthly magazine which goes to all our users, and I want you to tell me of any other company that takes care of the doctor AFTER the sale is terminated like we do. What other company sends you a wonderful magazine like that, maintains an educational department; puts on monthly clinics; puts on a yearly convention that last year cost us $17,000.00. What other company does that?

And sixth I would say, never call on a doctor with the idea that physiotherapy is next to a cure-all ---- stay away from the word "cure" entirely. If he asks me about some pathology I usually state whether or not diathermy is "indicated" there or not, according to some physician he or I may know or according to some reprint that I might have on hand.

I am a great one for carrying reprints, clippings, articles, medical magazines, and subjects clipped from medical books where I can get at them in my brief case. You should

see the size of my bag. I make it my business to continually collect them. Its surprizing how many articles are run in our daily papers under the "health column" on quartz light and everyone usually reads them.

You know its great when you can see by a prospect's countenance that he doubts you and you open your bag and show him some Fischer reprint or some article, or newspaper clipping (I used the one on Red Grange in the Chicago Tribune getting his arm fixed up with diathermy AND HE PLAYED FOOTBALL THE NEXT DAY quite a bit, when he was in vogue) and you get the prospect's confidence, and he imagines you probably do know something about the subject.

(7) Another stunt I pull while interviewing the prospect is to call some one of my satisfied users nearby and get him to tell the wonders of diathermy for me, to my prospect over the phone. However, be careful when you do this; feel the doctor out first and make sure they are not deadly competitors.

(8) I had worked for Fischer about two weeks when suddenly it dawned on me one day that in this game time is money, and if I ever expected to make real money selling diathermies and the rest of our line I had to get volume. Unfortunately we are handicapped by the doctors office hours many times, so I usually phone a number of doctors offices early in the day so I can line up my work so as to be in the various offices at the tail end of their hours. Even so, that never paid as well as wearing out shoe leather in the evenings after the last patient had beat it, planning on getting in the doctor's office about 8 P.M. Having no territory in Chicago in the early days, considerable of my commission was spent in hard earned carfare trying to get orders and then spending more money installing orders. This plus the time lost making two trips, was a problem to me, even after I was lucky enough to get the order.

So I made a peddler out of myself, and carry

the stuff in the car, - call, sell, install and demonstrate at one crack, because it saves time. I've never hurt a "G" or a cart carrying them several hundred miles over bad roads, nor have I harmed a Morse Wave Generator, and I have never broken an AC Hanovia Burner yet, carrying it on the floor of the seat beside me, in our regulation crate. I usually wrap the "G's", etc. in an old blanket.

Carrying the stuff with you, not only gives you many more hours per week but the doctor sees what he is buying, (no photo ever does justice to any piece of electrical equipment) and when you hit him "cold turkey" and get his enthusiasm all worked up, go down and pull the stuff out of the car and demonstrate before he cools off and decides to sit down and write for catalogs from every diathermy manufacturer who advertises in the AMA. I know because I've had it happen. I've called on a man without my car, got him all worked up, couldn't close him, and when I got back there two weeks later to get the name on the dotted line, found him all loaded with our competitors arguments against our product.

If you carry the stuff right in the car, put it in, demonstrate on his patients, etc., he never thinks about other machines that might be made by someone else. Treating patients in his office and telling them to come back the next day makes getting settlements easier that NIGHT.

Even if he doesn't settle that night he feels under obligations to you for cutting up the block tin, using the soap, and cutting up the elastic bandage, etc., plus your time, and that, plus pressure and all the other arguments you have usually brings home the bacon. Always carry extra soap (in new tubes) block tin and elastic bandage with you, so if you fall down on a man, your outfit is ready for the next man that will let you work on his patients. However, I want to say this, that in my experience whenever a man would let me do all these things plus TREATING his patients the

machine usually stuck. In fact just FOUR men have turned me down after doing all these things since I've been with the company. That doesn't mean I've just yanked out four outfits, because I have bad accounts too. The bad accounts I don't include because I actually got SETTLEMENTS on them, and the fact that they fell down several months afterwards was not my fault.

(9) There are many times I wish I had the nerve of my good friend Mr. Hunt of Detroit Office and could sell diathermies on the surgical side of this intensely interesting subject. But unfortunately I have a confession to make - I have never co-agulated a tonsil or a hemorrhoid in my life. One reason is the fact that when I am carting machines thru the wilderness I can't afford to wait in a town long enough for the doctor to decide whether or not the end result of tonsil co-agulation compares favorably with his regular surgical procedure. So about as far as I get with the surgical end of the machine is a quarter's worth of beef from the butcher shop and a demonstration on that.

Naturally when demonstrating diathermy machines that wear out good rubber casings, I usually ask the doctor to get medical cases for me to work on, which I know I can show results in 30 minutes per patient, and I ask him to procure for me patients that presumably have the following pathologies, any one of them.

Lumbago
Inflammation of the sciatic nerve
Dysmenorrhea
Arthritis cases (not arthritis deformens)
Sprains
Contusions
Bursitis cases

If I roll in the machine at 2 and can treat a half dozen of these cases for him, at supper time he'll wonder where he has been all his life. Now you see if I asked for simple goiters, gonorrheas, ankylosed joints, fracture cases, etc. etc., I couldn't show him any spectacular results the first day I

treated them, altho we all know diathermy does a great deal for these unfortunates in a comparatively short time.

I always make the doctor buy a loose leaf note book and have HIM draw pictures of the connections, etc., for the various techniques so he'll quickly get the hang of the machine. The reactions of your demanding that he buy a loose leaf note book leads him to believe that you are very probably a master of your subject. Then after he's bought the machine, proceed to teach him ALL YOU KNOW.

DON'T MAKE THE TERRIBLE MISTAKE OF RUNNING AWAY FROM HIM and for goodness sake don't tell him you are in a terrible hurry and must get to Blanksville by 4 P. M. or 9 P. M. or NOON. Lead him to believe you are there until he's mastered the subject, then call on him until he does master it, then tell him he's on your STAFF as a prospect scout and if you treat him white believe me he'll fight for you.

Always remind him of his promise to be on your staff and tell him you are holding up your end by cleaning his gaps and wiping off the glass on his meter (in other words I mean actually giving him service tinkering around his machine, making SURE everything is 100% OK) but he is falling down on his end - "Where are the prospects he promised?" If you don't believe this works, write to Mr. Mathis and ask him how many equipment orders I have received OVER THE PHONE from men I never had seen or heard of.

However don't tell him how much you make on a machine, but lead him to believe you can only make a decent living if he holds up his end and talks diathermy to the fellow in the next town so you can sell him without spending too much time with him.

(10) So last but not least, by any means, I want to impress on you the amount of good you can do yourself financially by continually taking care of the men you have sold by keeping them pepped up, happy and satisfied.

E. W. E R I K S O N

Inasmuch as I promised Mr. Mathis sometime ago to write an article (goodness only knows why he picks on me) on the competitive selling of HANOVIA QUARTZ Lamps and how to teach a doctor to get the results he can rightfully expect from an ultra-violet lamp, I'll stick to diathermy today.

My favorite technique is the SIMPLE GOITER work we can do with either a "G" or a Senior. It does not work satisfactorily in TOXIC or EXOPTHALMIC Goiters, in fact I know it does them harm, - especially the Toxic types. So to start be sure of your diagnosis. Give 600 MA to the neck A and P by means of the new style clamp electrode (well soaped) for 5 or 6 minutes. Wipe off the soap and powder the neck or goiter with talcum and use the glass HF surface electrode on the goiter by means of footswitch control until the goiter becomes pink. Light the Sands Iodine Vaporizer (we have them in stock at $5.00 complete) for EXACTLY (very important) 2 1/2 minutes and spray iodine on the goiter until a light brown color. These fumes are absorbed into the tissue very rapidly, so if your technique has been right the neck is clean (all iodine absorbed in tissue) in 3 minutes after the treatment is over. You will find iodine in the urine one hour after the treatment. Treat them two times a week, never oftener and 8 to 15 treatments usually does the work.

In discussing high blood pressure cases with a doctor, always explain that all you can do is give them relief for a comparatively short time, and that they must be given treatments periodically to keep them out of danger. The Senior works best I think tho the "G" should work very well. With men who have many of these cases I usually hold out until I get a Senior order from them, by showing them Grover's reprint we have on "Hypertension", where he says in plain language to buy a big machine for this class of work. It would be well for all the boys to carry this reprint as an excellent argument for buying a Senior. How Many Of you have read the wonderful reprints the company gives away free to MD's? Boy, they are a

medical schooling in themselves. Read them.

TECHNIQUE

Use the High Voltage Diathermy connections and have the patient lie on the cushion (clothing intact) which is connected to one side of the machine and the nickle plated handle which the patient holds in his or her hands (lying down) connected to the other side of the machine. First treatment 20 minutes only at 300 MA to see how the patient reacts. Sometimes the doctor completely overlooks some focil of infection, which a full dosage will stir up considerably, so I usually feel my way on the first treatment. If I get no reaction I give 500 MA for 30 minutes the second day and continue this setting of technique for 10 consecutive days. The patient at the end of the 10th treatment should have a blood pressure low enough to be out of danger (I mean by that low enough so as to be out of danger of having a stroke). I never hope to get the B. P. down to normal if the patient is elderly or has a deposit of mineral on the inside of the arteries. I think a great deal of the "H.B.P.Technique", tho, many physicians do not think it worth much. There's nothing a physician can do except diet the patient, and honest men will tell you that's not worth much, and that diathermy will relieve the symtoms, which are usually very disagreeable, with this pathology, gives them a tool with which to keep the patient alive that much longer, in my estimation.

PROSTATITIS CASES

I want to refer to the prostatitis cases we have in elderly gentlemen who must urinate a great number of times every night. By using the Prostatitis Electrode covered with KY jelly and inserted into the rectum so that the flat side of the electrode rests against the prostate, and using the Medium Voltage terminals with a large mesh on the abdomen, you can do wonders for them and they are grateful to the doctor forever after. About ten treatments finds them urinating twice a night and twenty treatments not at all, if they urinate before retiring.

E. W. ERIKSON

I treat for 30 minutes giving about 104F or 105F (higher if they can comfortably stand it) on the thermometer. Sims position or have them lie on their backs. Treat daily for ten treatments then rest them a week and treat ten more times.

Pelvic Disturbances in the Female.

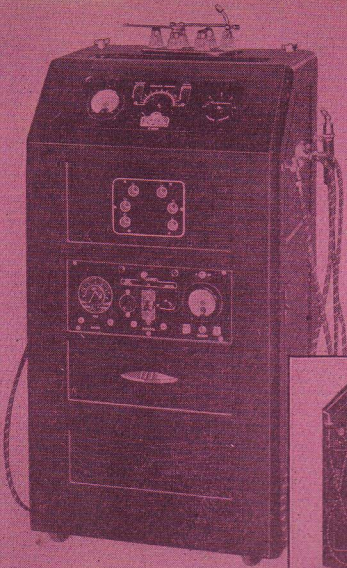
I have a great deal of respect for Chapman's electrode. By cutting an immense block tin electrode that covers the whole female abdomen and inserting the Chapman's electrode in the vagina under the cervix proper (it can easily be done without the use of a speculum) and by treating at the ABDOMINAL toleration of the patient, wonders can be done for women who have pelvic congestion of any type, ovarian menorrhagia, endocervicitis, etc. I treat them daily for 30 to 45 minutes for ten treatments and then give them a weeks rest before starting another series of ten treatments using the medium voltage connections. I have found the Corbus endocervicitis electrode to be absolutely worthless in the FEMALE. (it is useful however in chronic GC infections in the male)

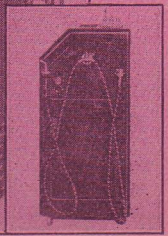
LUMBAGO, SCIATICA, DYSMENORRHEA, ETC.

Undoubtedly these techniques are all familiar to you, merely placing one electrode on the abdomen and the other over the lumbar region of the spine, placing the smaller of the two electrodes over the region of the pain. In lumbago, place small one over the seat of the trouble on the spine, in dysmenorrhea, small one over the pubis and large one over the spine, etc., etc., in inflammation of the sciatic nerve, one electrode over the back of the hip and the other on the outside of the knee, placing the smaller electrode over the region the patient complains about the most. I treat these cases daily for 30 minutes. Very few treatments clean these cases up nicely.

E. W. ERIKSON

Chicago, Ill.
4-27-26





Fischer MODEL "CSWI" COMBINATION CABINET

Combines in one cabinet — short wave, galvanic current, desiccation, cautery, diagnostic circuit, suction, suction-vibration, pressure, pressure-vibration. Designed for eye, ear, nose and throat specialists, also for all physicians desiring these facilities.

The short wave unit in this cabinet is the well-known FISCHER Model "SWI-12", affording all short wave applications, including inductance cable. The other facilities, galvanism, desiccation and so on, are independently produced and in every way as efficient as when housed in separate cabinets.

GUARANTEED PERFORMANCE

Satisfactory performance is guaranteed. Special features are: A perfectly smooth galvanic current; desiccation current, high voltage, low milliamperage; cautery current without jumps; diagnostic circuit sufficient for all diagnostic purposes; suction and pressure changes to vibration simply by throwing respective switches. Copper tubing is used inside cabinet instead of unstable rubber tubing.

- **Full information sent without obligation. Simply sign and mail this card.**

LIST OF ACCESSORIES INCLUDED

One complete set of accessories, required for using the various facilities of the Combination Cabinet.

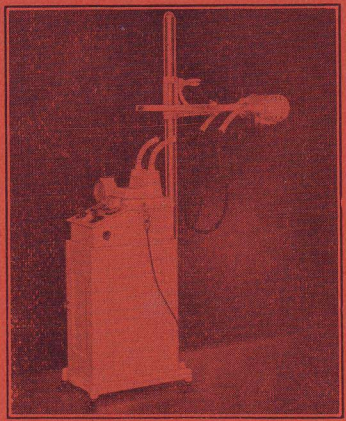
SIGN AND MAIL THIS CARD TODAY

Please send full information regarding your Model "CSWI" Combination Cabinet. No obligation.

Name.....

Address.....

Form 1603 Printed in U.S.A.



FEATURES

Illustration above shows unit mounted on mobile base and lead-lined cabinet (for film protection). Cables metal protected and always out of way. Tube inclosed in metal case. Control very fine.—two meters with separate controls — synchrotimer accurate to 1/60 second — remote control switch. Finish black and chromium or ivory and chromium. Arrangement with counterbalance, with table available when desired.

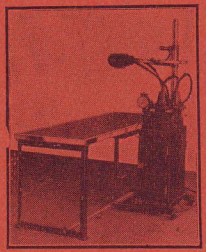
FISCHER Model "DSP-20"

Superior in Power — Positively Shockproof — Very Compact — Radiography — Also Fluoroscopy — and Marvelously Simple to Operate.

For making radiographic diagnosis — in such cases as fractures, foreign bodies, pathology of heart, lungs, stomach, colon, sinuses, treatment of superficial skin lesions, and so on — and for fluoroscopy, this new MODEL "DSP-20" is easily the outstanding unit in its field. **It delivers 20 M.A. at 67 K.V.P.**

SUPERB PERFORMANCE

Superb chest negatives can be made in 1/10 to 1/5 second. A knee or shoulder in ½ second. Stomach or colon in ½ to ¾ seconds. Completely flexible — usable with table and Bucky or without — finest quality materials and workmanship. One x-ray specialist called this unit a "performing fool." In portable or semi-portable X-ray apparatus, you will find this unit unexcelled in power, flexibility, simplicity and efficiency. Both milliamperage and kilovoltage variable.



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Please send immediately, by return mail, descriptive folder on the latest model FISCHER "DSP-20" Shockproof X-ray Unit. No obligation.

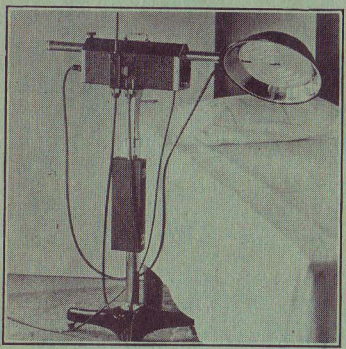
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Form 1602

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ULTRA-VIOLET . . . INFRA RED . . . CARBON ARC Lamps



MERCURY QUARTZ

FISCHER "Cold" Mercury Arc Lamps are available in two basic types — for general and for orificial irradiation. Character of radiation same in both types. All lamps have precision control, enabling operator to deliver rays at low, medium or high intensity. A very important characteristic of these lamps is the intensity of the rays at about 2536A. For general use, the FISCHER Combination Lamp (No. 3980), equipped with both grid type and orificial type burners, is recommended. Other models available.



INFRA RED

This FISCHER Infra Red Generator made with singly heating element. Easily adjustable to any position. Eleven - inch reflector. Offers every service of infra red radiation.

CARBON ARC

The FISCHER Model "O" Twin Carbon Arc Lamp delivers as much ultra violet, visible, and infra red radiation as any carbon arc lamp on the market, operating on a regular lighting circuit. Operates equally well on direct or alternating current. Localizing cones available when desired.

Sign and Mail This Card Today

Please send full information — no obligation — regarding the lamp I have checked below.

- ☐ FISCHER "Cold" Mercury Arc Lamp
- ☐ FISCHER Infra Red Generator
- ☐ FISCHER Model "O" Carbon Arc Lamp

Name.....

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Form 1601

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INSTALLING AND OPERATING INSTRUCTIONS FOR THE FISCHER "LO" SENIOR AND "FO" SENIOR DIATHERMY CABINETS.

Remove the caps from the four Leyden jars and, after a thorough cleaning, fill them with a saturate solution of salt water up to 1/4 inch above the level of the outer brass coating. Use one-half pound table salt to each jar. The fluid should be poured into the jars to just above the top of the outer coating, and immersing the carbons will increase the level to the desired point. A film of paraffin oil on the water (about 1/4 inch or so) will reduce evaporation.

Carefully replace caps on the jars, wipe them thoroughly dry, and set two on each side of the upper compartment in the small partitioned sections with metal bottoms. Connect the four wires leading from the sides of this compartment to posts on the tops of the carbons on the jars. Then connect the two sets of bifurcated cords leading from the front of the cabinet to the binding posts on the sides of the jars.

Should any moisture be present around the jars, dry thoroughly before using the machine.

The solution in the jars needs little attention, but it is advisable to make periodic observation to see that the level does not fall too low. Observe this every few days while the cabinet is new, and you may gradually lengthen this period from experience. Should the water level fall to or below the top of the outer brass coating, plain water should be added immediately.

If, for any reason, the solution of one jar needs replenishing, or you replace a jar, it is important that all jars be emptied and refilled with fresh brine as above instructed, to insure a perfect condenser balance.

The Milliampere Meter

Connect the short nickel-plated rod to post A on cabinet and to F on the meter.

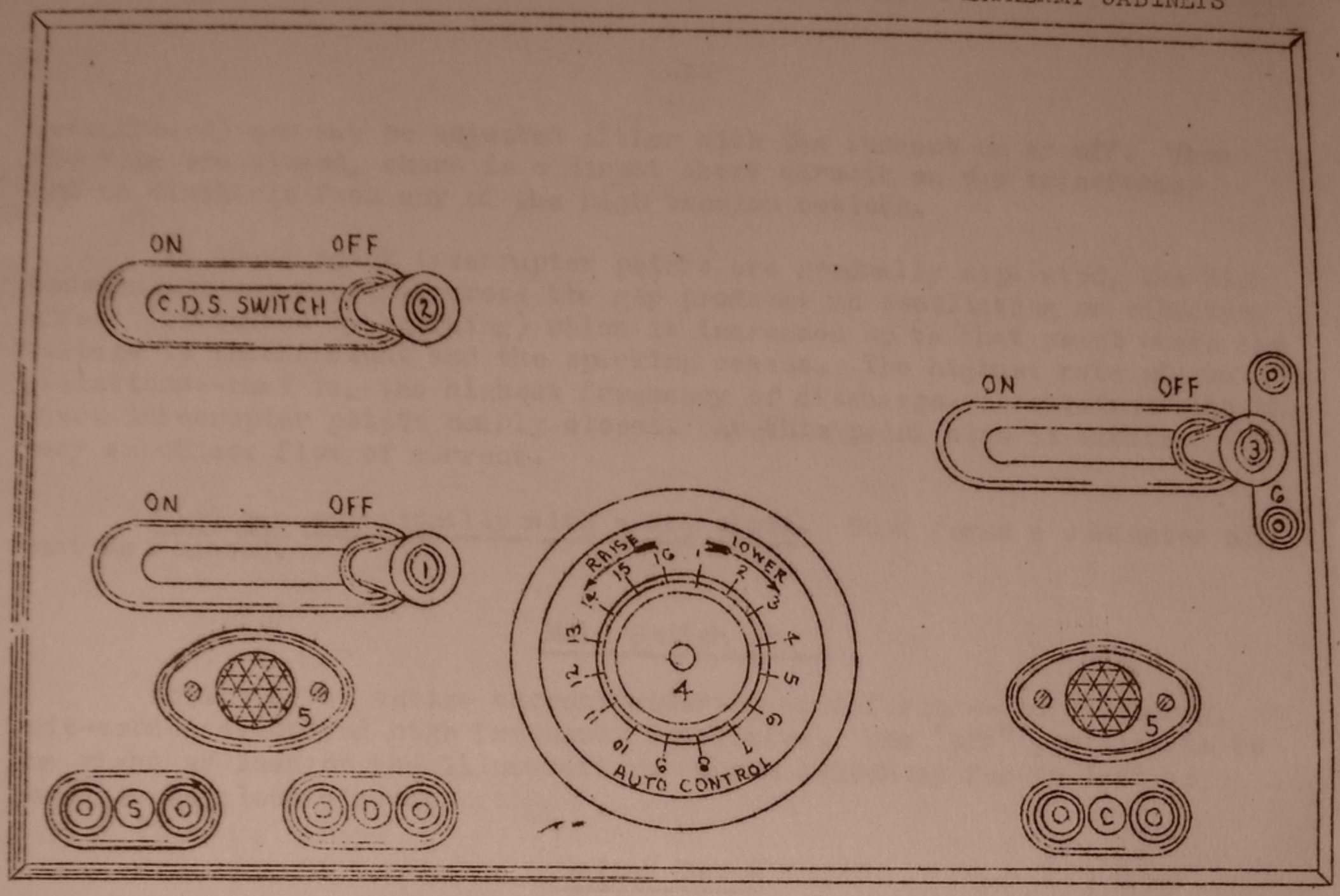
Near the bottom of the meter, mounted in the glass face itself, is a small adjusting screw for the purpose of enabling the operator to move the needle back to zero when necessary. Turning this screw to the left or right moves the needle independent of the dial.

The Multiple Spark Gap (Kolisoher)

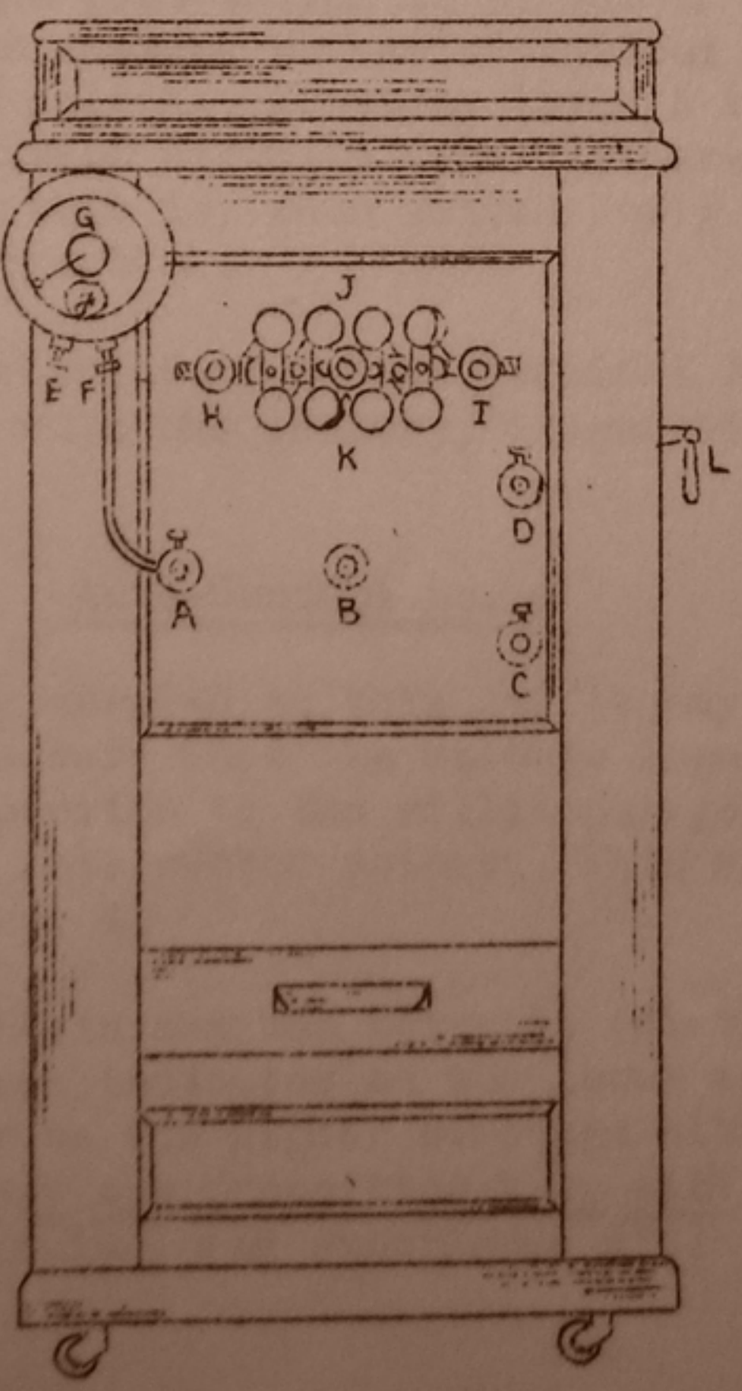
Unscrew the two rods from the extreme ends and set the gap between the posts H and I on the cabinet; then set the end rods through the posts H and I, screwing them firmly into the ends of the gap.

The spark interrupter gap is the most important regulating feature on any high frequency generator. Its function is to regulate the discharge of the high tension current in connection with control No. 4 (on the top

DIAGRAMS OF THE FISCHER "LO" SENIOR AND "FO" SENIOR DIATHERMY CABINETS



1 - Main Switch for Diathermy, Auto Condensation and High Frequency Modalities.
2 - Main Switch for Cautery, Diagnostic and Sinusoidal Currents.
3 - Switch for throwing Foot Controller in or out.
4 - Controller for Auto Transformer.
5 - Pilot lamps (enclosed).
6 - Foot Switch Terminals.
S - Sinusoidal Terminals.
D - Diagnostic Current Terminals.
C - Cautery Terminals.



switchboard) and may be adjusted either with the current on or off. When the tips are closed, there is a direct short circuit on the transformer and no discharge from any of the high tension outlets.

As these spark interrupter points are gradually separated, the high tension current passing across the gap produces an oscillating or vibratory effect (evidenced by sparking) which is increased up to that point where the voltage is insufficient and the sparking ceases. The highest rate of oscillations--that is, the highest frequency of discharge--is obtained with the spark interrupter points nearly closed. At this point also is obtained the very smoothest flow of current.

Wipe gap occasionally with a dry cloth. Dust forms a conductor and must be removed.

Main Switch No. 1

Controls the entire current entering transformer--the diathermy, auto-condensation and high frequency modalities. The "off" position is to the right as seen on the illustration. Throw switch as far to left as possible to close circuit.

Switch No. 2

Controls the cautery, diagnostic and sinusoidal currents, indicated on the illustration as outlets C, D and S (refer to drawing of top of cabinet). "Off" position is indicated. Throw handle to left as far as it will go, to close circuit.

Switch No. 3

Is used to throw the foot switch in or out of the circuit. Lever 3 in position as indicated on drawing on top of cabinet leaves an open circuit to be closed with the foot switch. Throwing lever 3 to the left as far as it will go closes the high tension circuits (the diathermy, auto-condensation and high frequency modalities) that is, when switch No. 1 is closed, and automatically cuts out the foot switch.

Neither lever 3 nor the foot switch terminal 6 nor the foot switch itself, has anything to do with the cautery, diagnostic and sinusoidal modalities.

Auto-Control No. 4

That the currents generated by this outfit may be at all times perfectly resonant, it is necessary that the voltage input to the main transformer be altered in exact proportion to the milliamperage desired, and the proper operation of the spark interrupter points. This regulating function is performed by auto-control No. 4.

Don't attempt to obtain maximum currents (diathermy, auto-condensation, etc.) with auto-control indicator on the lower settings, and don't set this auto-control indicator on the higher settings with the spark interrupter points nearly closed. Adjust one proportionately with the other, until you become familiar with the machine, and experience will tell you how to proceed later.

Pilot Lights No. 5

Indicate closed circuits; the one on the left-hand side the C, D and S currents, and the one on the right-hand side the diathermy, auto-condensation and high frequency modalities. These lamps are of 6.2 voltage capacity.

Foot Switch Terminals No. 6

Tips on the end of the foot switch cable are to be inserted into the small sockets.

When the foot switch is to be operated, controller No. 3 is left in the "off" position (to the right).

Terminals "C"

Voltage available varies from 0 to 8, and the amperage over 100, which current output is increased or decreased by manipulating auto-control No. 4--minimum cautery current is obtained with indicator on control No. 4 on point 1; maximum, when indicator is placed on point 16.

The cautery circuit is closed by switch handle No. 2. Tips on cautery cords are to slip into sockets at C.

Terminals "D"

The current volume from 0 to 12 volts is increased or decreased with the auto-control No. 4, point 1 being lowest voltage and point 16 highest. The tips on the ends of the diagnostic lamp cord are inserted into the two sockets at D. Close diagnostic circuit by throwing lever 2 to the left as far as it will go.

Terminals "S"

The current available from these outlets varies from 0 to 35 volts at a very small amperage, depending on setting of auto-control No. 4.

Binding Post "E"

Is used as one terminal when employing either the opposite poles C and D for diathermy or auto-condensation work.

Outlet "B"

The highest voltage high frequency terminal is to be employed in connection with monopolar discharges only. For use with high frequency vacuum and non-vacuum electrodes, fulguration, monopolar and indirect desiccation, etc. Have handle L down.

Outlet "C"

The lowest voltage diathermy outlet, to be employed mainly where the body resistance is not great. Will give best results when treating the thinner parts of the body and for electro-coagulation.

Outlet "D"

The highest voltage diathermy and auto-condensation terminal, used with bipolar applications in combination with outlet E through meter.

Practically all medical diathermy applications should be administered with connections made to outlets D and E and handle L DOWN.

The greatest volume of current will be obtained from the outlets D and E with the handle L UP, but the nature of the discharge is not as well suited to medical diathermy treatments as when the handle L is down. Using outlets D and E and the handle L up, however, delivers an exceptionally strong surgical diathermy (electrocoagulation) current.

Switch Control "L"

Is mounted on the end of a long insulated shaft which in turn is directly connected to the large high tension switch W inside the cabinet.

To obtain lowest voltage have the handle L turned up and use outlets C and E.

To obtain highest diathermy and auto-condensation voltage have the handle L turned down and use outlets D and E.

This control switch must be either pointing straight up or straight down--never at any intermediate setting.

Ground Wire

Is so connected within the cabinet as to protect your line wiring as well as any other appliances that you may have connected to the same line. It is necessary to connect this wire by means of a good clamp to a grounding medium (water pipe preferred), soldering all connections. Use a No. 14 B and S gauge wire, or heavier.

To Obtain Medical Diathermy

Set indicator on auto-control No. 4 on point 1. Switches Nos. 1, 2 and 3 must be in "off" position. Close the spark interrupter points with master controller K.

For the first test, place one cord tip in binding post E and attach the other cord to outlet D. The other ends of the cords are attached to the electrodes, and we will substitute a glass or bowl of salt water for the patient.

Clip off two small pieces of sheet block tin electrode material and attach them to the cords with the clips, Catalog No. 874. Clamp the cord tips in the clips and drop the pieces of metal into the brine, being sure they do not touch one another.

Close switch No. 1, then No. 3, and gradually open one pair of the spark interrupter points until the needle of the meter moves upward. As the points are separated the reading will increase. Snap auto-control switch No. 4 to point 2, open the spark points a bit more; advance No. 4 to 3,4,5, open the second pair of points; then the third pair, and increase and decrease the volume of current generated as indicated on the meter, until you become familiar with the controlling procedure.

Now try the other set of diathermy outlets E and C and you will find that as you increase the resistance of the water medium and try various settings of auto-control No. 4, as well as the Kolischer spark gap, that the readings will be quite different as compared to current generated when employing outlets E and D.

Don't attempt to apply the electrodes to a patient, or to yourself, until you have become thoroughly familiar with the apparatus.

To Obtain Electro-Coagulation Current

Set indicator on auto-control No. 4 on point 1. Switches Nos. 1, 2 and 3 must be in "off" position. Spark gap closed.

It is customary when speaking of electro-coagulation technic to refer to the active and indifferent electrodes; the former active electrode being the small point or disc which is placed in direct contact with the diseased tissue and the latter, the indifferent electrode, a larger metallic plate to cover a great deal of skin surface without danger of destroying healthy tissue, which is placed preferably on the opposite side of the body or at least adjacent to the point of operation.

Make connection from indifferent electrode to binding post E. Connect the active electrode to outlet C.

Lay a piece of raw meat on a flat plate, to serve as the patient for the preliminary test. Grasp the well insulated handle of the active electrode at least 2 inches away from the metal end and preferably with the flexible connecting cord passing back over the hand. A foot switch should be employed, with the terminals set in outlets 6 on the top plate.

Close switch No.1, open one pair of spark interrupter points slightly, step on the foot switch to close the circuit, leaving switch No. 3 in the "off" position, or if the foot switch is not employed throw switch handle No. 3 to the left, bring the point of the active electrode down to the meat and you will observe sparks from the point of contact and some small reading on the milliampere meter. Increase and decrease the current by adjusting the spark point back and forth, using one pair, two or any number that you may desire, and at various settings of auto-control No. 4.

Observe how the milliamperage will vary with the different settings; hold the electrode away from the meat a short distance to cause sparking; now make contact on the surface to produce a blanching effect; press the tip of the electrode into the meat and notice how you can produce varied depths of desiccation, coagulation and blanching and how the meter needle vacillates with each different type of application. To be brief, try a series of experiments along this line to familiarize yourself with the current action before trying any applications on living tissue.

Many operators fearing the danger of burning out the meter as a result of accidentally touching the two electrodes with the current on when performing electro-coagulation operations where the active and indifferent electrodes come quite close together, prefer to disconnect the meter and take current directly from terminals A and C.

To Obtain d'Arsonval Auto-Condensation

First, and always see that switches 1, 2 and 3 are in the "off" position. Set indicator on auto-control No. 4 on point 4. Spark gap closed.

Place the heavy auto-condensation cushion, Cat. No. 420, on your table and connect same with one of the rubber covered cords to binding post E.

If the patient should be reclining comfortably on this pad, and if pillow is used it should be placed under the pad in preference to immediately under the patient's head, because in the latter event too much of the body is too far removed from the electrode in the pad itself. Connect other rubber covered cord from outlet D to the long nickel-plated auto-condensation handle, Catalog No. 58, which handle is held firmly in the patient's two hands. Always place a folded towel or other similar medium under the hands to prevent any possible leakage from the handle to the body.

Close switch No. 1 and then No. 3, and gradually open the spark interrupter points until a smooth flow of current is obtained, but not so far that the discharge becomes noisy or uneven in character. The current is increased and decreased by means of auto-control No. 4, as well as the spark interrupter points. It is not necessary to employ individual pairs of points when administering an auto-condensation treatment, but rather have all points equal distances apart and then adjust with the master controller K.

To Excite Glass High Frequency Electrodes

Set indicator on auto-control No. 4 on point 3. Switches Nos. 1, 2 and 3 must be in "off" position. Spark gap closed.

Connect the heavily insulated cable, Catalog No. 83, to the outlet B and to the small ring on the end of the high frequency electrode, Catalog No. 9. Close switches 1 and 3 and gradually open the spark interrupter points until a glow of violet light appears in the bulb. Current volume is regulated two ways, by the auto control No. 4 and the spark interrupter points.

Other glass vacuum and non-vacuum electrodes are connected and operated in the same manner.

Cautery

See that all three switches, Nos. 1, 2 and 3 are in the "off" position. Switches Nos. 1 and 3, and all of the outlets and appurtenances on the front of the outfit, are to be ignored when using cautery.

Set tips of heavy rubber covered cords into outlets C on top of cabinet and connect other ends to the cautery handle, Catalog No. 301. The cautery knife is mounted in the opposite end of the handle, in any one of five positions, one of which is illustrated. The cautery knife should never be heated beyond a cherry red.

Throwing switch handle No. 2 to left closes the circuit, and the volume of discharge is increased or decreased with the auto-control No. 4; point 1 being lowest, and point 16 being highest.

Sinusoidal

See "Cautery" instructions.

The rubber covered cords are to connect from the outlets S on top of cabinet to either the metal treatment handles, Catalog No. 614, or to specially designed pads or electrodes to suit the individual case. The circuit is closed with switch handle No. 2, and the volume of discharge is increased or decreased with auto-control No. 4.

Diagnostic Illuminator

The three switches Nos. 1, 2 and 3 must be in the "off" position, and auto-control No. 4 on point 1. Switches Nos. 1 and 3 and all of the appurtenances on the front of the cabinet, are to be ignored when using this modality.

Set the tips on the end of the diagnostic illuminator into the outlets D on top of cabinet. Throw switch handle 2 to left and gradually increase current to lamp by advancing indicator on auto-control No. 4 one step at a time until a coloring just short of white is obtained in the bulb. Going beyond this point will burn out the lamp.

H. G. FISCHER & CO., Inc.,
2323-2337 Wabansia Avenue,
Chicago, Illinois

Form 615A

OPERATING INSTRUCTIONS FOR THE MOTOR AND PUMP FEATURES CN
FISCHER COMBINATION CABINETS.

To Obtain Air Pressure

Open the valve in handle by turning the knurled ring to the left. Set the pointer on "Pressure Regulator" to side marked "Pressure."

Attach the desired atomizer to the tapered end of the handle. Press the red button on the motor switch and regulate the pressure and resultant spray by turning the knurled collar to the right to increase, and to the left to decrease. To release the pressure instantly, pull the collar down.

Always be sure that the valve in the pressure handle is open before starting the motor.

Heated Air

Air that can be applied at any desired temperature and from zero up to 35 pounds pressure is available.

To obtain heated air, slip the tapered end of handle into the tapered socket in the heater with a slight twisting movement, leaving the binding posts in any convenient position.

Next, connect the cautery cords to posts on the heater and to the cautery posts on the cabinet. This cautery circuit is of very low voltage, and there is absolutely no danger of any electrical shocking either to operator or patient, even though both binding posts and the body of the heater are touched at the same time.

Start the motor, set the indicator to "Pressure" and allow the air to pass through the heater. Regulate the heat of the element as you would the cautery knife--by advancing and retarding lever. It may appear necessary to use the full power of the circuit to generate the desired heat at the start, but after a moment you will find that a sufficient temperature may be maintained with lever on button 6 or 7.

The air spreader attachment, No. 1572, is arranged to screw into the heater and it is provided with outlets on the sides only, to prevent a concentration of heat to any one small section under treatment. Such concentration of heat would soon become unbearable, but would result if the air were allowed to pass straight through. As a result of the heated air being properly spread, you will find that when the rubber cups are slipped on, the outer edge will become just as warm as the center.

When through using the heater, cut off the current first--then shut off the air.

You will readily see from the above description that the heat, as well as the volume of air, is under positive control at all times.

Vibration Pneumatic

Open the valve in handle by turning the knurled ring to the left as far as possible. Select the vibratode desired and set it firmly, with a slight twisting movement, onto the tapered end of the handle. Slip the rubber vibratode cover over the metal edge of the holder and turn the indicator "Pressure Regulator" to "Vibration."

When using the cavity vibratodes, care must be exercised that the small holes near the end, where the applicator is fastened to the handle, are not all closed at the same time. These are "vent" holes to allow some of the air to escape and to prevent the caps from bursting from too much pressure.

Should more pressure be desired to inflate any of the vibratodes to a greater extent, gradually turn regulator from "Vibration" toward "Pressure" until the right amount of expansion is obtained.

Heat and Vibration

Heat, with vibration, will increase elimination by opening the pores and generally stimulate surface activity. A greater degree of heat can be borne when vibration is applied at the same time.

The combination of heated air and vibration is obtained in the same manner as the "Heat" described in the foregoing, with one exception: The indicator must be set to "Vibration" instead of to "Pressure," and, as more air is required, gradually turn this controller toward the "Pressure" side. The rubber cup acts as the vibratode.

Fluid Heater

Maintains heat of the solutions in the various bottles at proper temperature for instant use. It is always advisable to warm the fluids before applying--hence, press the red button on the heater switch a moment or two before using the sprays.

Suction

To obtain vacuum for using the various cupping devices, start the motor by pressing the red button on the motor switch. Set the indicator on "Vacuum Regulator" to the farthest point marked "Vacuum."

The glass cups are attached by pressing the end into the soft rubber bushing in the vacuum handle with a slight turning movement. The rubber cups are attached with the small No. 1573 metal piece in the same manner.

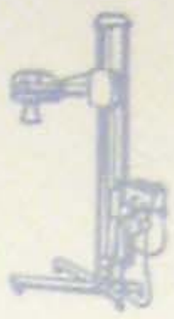
The vacuum handle is arranged to separate at the joint for inserting gauze or absorbent cotton when the suction is to be used for extraction pus or similar substance. When a quick release from vacuum is required, pull the collar down with the thumb and index finger.

Suction Vibration

By turning the vacuum regulator to the farthest point toward "Vibration," you will notice that although there is still some sucking effect, it pulsates rapidly. By turning this controller to the right or left, most any degree of vacuum or vacu-vibration may be obtained.

This vacu-vibration is indicated wherever a superficial local hyperemic condition is desired. A careful study of this modality will reveal almost endless possibilities. It is especially valuable for development of flabby tissues and muscles.

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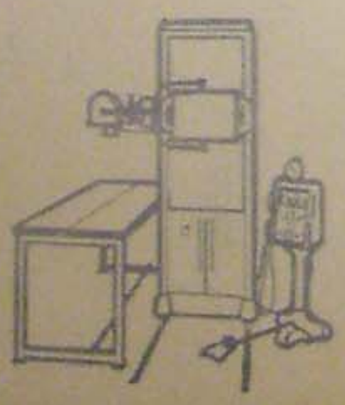


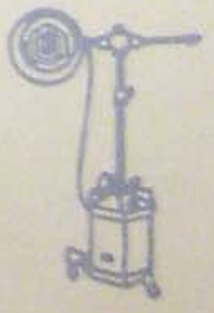
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ULTRASONICS

Introduction

At rare intervals a therapy portending spectacular effectiveness is presented to the healing professions. In almost every instance the introduction of such energies, and the devices by means of which they are generated, follows a familiar pattern. Initially comes the stage of fantastic claims engendered by the pioneer enthusiasts. Then appears the "alarm campaign" fostered by research skeptics through experiments on animals and the assumption of potential dangers attending clinical application on humans. Finally emerges the era of universal acceptance imposed by the irrefutable evidence secured in thousands of routine cases by progressive leaders in their fields.

The pattern is illustrated nicely by the histories of some of the thermal energies and devices in general use today. After World War I, Diathermy, as generated by Spark Gap apparatus, became a universally used modality. When Short Wave apparatus, an import from Germany, appeared in 1933-4, it was accompanied by the usual fantastic claims based on the works of Schliephake. Promptly, the "alarm campaign" came into being through the interjection of doubt as to the possibility of unknowingly overheating internal organs. Yet, presently, Short Wave Diathermy is considered a dependable and safe procedure among all professions.

A more recent example of this pattern is found in the introduction of the so-called "radar" - microwave - Diathermy apparatus presented just a few years ago. First, the exaggerated claims for this "new" energy; then, the "fear campaign" in the creation of doubt as to the danger of producing lenticular opacities and deep tissue damage; but, finally, the device is found in daily use in hundreds of professional offices.

Today, the therapeutic use of sound waves at frequencies far beyond the range of human hearing - variously termed "Ultra Sonics", "Sonar", "Ultra Sound", "Hyper Sonics", etc. - is undergoing a parallel experience and is just now emerging from the stage of alarm reaction.

A review of the existing literature on the subject reveals that such energies have been under investigation, both in the United States and Central Europe, as far back as 1927. Following a period of inactivity during the years of World War II, research was resumed and the findings were of sufficient interest to warrant the convening of interested workers in the Erlanger (Germany) Ultrasound Congress in May, 1949. Progress in the following year resulted in the International Ultrasound Congress in Rome in 1950.

Currently, at the meeting of the American Congress of Physical Medicine and Rehabilitation in Chicago, September, 1953, an entire morning was devoted to a "Symposium on Ultra Sound", a program of four papers by the following well known American authorities and investigators:

1. "Investigation of Possible Cavitation Occuring in Biologic Systems following Exposure to Ultra Sound" by J. F. Lehmann, M.D., Mayo Clinic, Rochester, Minn.

2. "Review of Literature and Clinical Applications of Ultrasonics" by A. A. Martucci, M.D., University of Pennsylvania, Philadelphia, Pa.

3. "Indications and Contra-Indications for Ultrasonic Therapy" by J. H. Aldes, M.D., Cedars of Lebanon Hospital, Los Angeles, Calif.

4. "Ultra Sound and Treatment of Sears" by Wm. Bierman, M.D., Columbia University, New York City.

Out of the wealth of experience reported by these qualified observers came the conclusion that in the thousands of treatments given, "not one severe local or systemic reaction occurred."

The present status of Ultrasonic therapy is best summed up in the words of Kenneth Phillips, M.D., F.A.C.S. Jackson Memorial Hospital, Miami, Florida, in a paper read before the Florida Medical Association at Hollywood Beach, April 26, 1953:

> "It (Ultrasonic energy) has been sufficiently tested to assure its safety providing its use is by those properly trained in basic fundamentals."
>
> "Results of this study, together with voluminous reports from European and American scientists, justify an opinion that this energy offers wide future possibilities."
>
> "The most outstanding therapeutic results of this study have been with traumatic injuries, acute bursitis and low back distress."

Ultrasonics Versus Diathermy Energies

In the consideration of the Ultrasonic energies as a therapeutic agent the fallacy that they are a form of Diathermy should be dismissed immediately. Any heating of tissue which may occur during Ultrasonic application is a by-product and not the prime objective. In fact, such heating is considered objectionable by some observers as an indication of improper technic. Dr. D. Wulff, M.D., states: "The limits (dosage) are set by the accumulation of heat which evolves in the case of higher dosages, either by the thermal overloading of the skin surface or at the inner interfaces, which frequently produce a most disturbing effect, that is, periosteal pain."

The differentiation between Ultrasonic energies and the radio frequency energies employed in Diathermy is very distinct.

When one head of a bass drum is struck, the opposite head also vibrates in synchronism because the motion imparted to the struck head is transmitted through the air within the drum by "sound" waves, i. e., actual motion of the air in the form of alternate compression and decompression which causes the opposite head to move to and fro in like manner.

The factor of importance is that a primary mechanical motion is required to inaugurate the air movement producing the related motion of the opposite member. The same phenomenon is observed in the every day use of the telephone receiver. Electromagnetic impulses cause a diaphragm in the receiver to move to and fro. When the receiver is held near the ear, the air movement is transmitted to the ear membrane which vibrates in like manner and the auditory nerve interprets this motion as speech or sound.

The radio frequencies employed in Diathermy are a radiant energy which do not produce air motion. The action is an electrical phenomenon rather than a mechanical function.

The single factor in common between Diathermy electrical energies and Ultrasonic mechanical energies is that both oscillate at high rates of frequency. The older type of Spark Gap Diathermy Unit oscillated at a frequency in the order of 1,000,000 cycles per second. Modern Short Wave apparatus operates at frequencies in the order of 26,000,000 per second. Ultrasonic apparatus functions at frequencies from some 300,000 to 3,000,000 cycles per second. In this respect, V. Buchtala, M.D., Lecturer in Radiology, Wurzburg (Germany) University Clinic for Surgery, writes in the British Journal of Physical Medicine, January, 1952: "Extended investigations have also shown that the frequency of the waves (ultrasonic) has little effect upon the clinical result provided that it lies somewhere between 300,000 and 1,500,000."

Since the human ear mechanism can not interpret "sound" waves much beyond a frequency of 12,000 cycles per second the terminology which has been applied to this newer energy becomes obvious: "ultra", beyond (the range of human hearing);"sonics", the science of "sound".

As a definite distinction of the difference in the physical properties of Diathermic radio frequency energies and Ultrasonic energies, it is well established that radio frequency energies may be transmitted through a vacuum, whereas "sound" waves require matter for their propogation and air, or matter, for their conduction.

Audible sounds may be transmitted relatively great distances through air depending upon the intensity, or volume, of the "sound" wave. However, as the sound frequency increases the air transmission decreases to the point that at therapeutic Ultrasonic frequencies transmission is lost in even the minutest air layer. This property necessitates the use of some medium of matter - usually oil or soap solution - in bodily contact to conduct the energy into an anatomic region.

Conversely, the radio frequencies of Diathermy are easily transmitted through air as is well illustrated in therapy by the common "air-spaced" technic of application.

These essential differences between Diathermy and Ultrasonic energies are stressed because it is imperative that the user of Ultrasonic devices shall understand the distinct individuality of this form of therapy in order to obtain the utmost in splendid results which lie within its capabilities.

Ultrasonic Generators

It has been shown that a primary mechanical motion is necessary to propogate "sound" waves. The high frequencies recommended for therapeutic Ultrasonics necessitate - at least to date - the use of the "piezo-electric effect", discovered in 1880 by P. Curie, peculiar to crystalline substances. The most commonly used substance is quartz due to its strength and activity.

When a quartz plate is cut from a mother crystal along predetermined lines of activity and precisely ground to a specific dimension, it possesses the singular property of being able to oscillate only at the frequency for which it was ground. Then, when an alternating electric current of exactly matching frequency is impressed upon the plate it becomes mechanically active by alternate compression and decompression within its own structure. While the limits of motion are small, the movement is vigorous and can be made to occur - within reasonable limits - at any desirable speed merely by altering the physical dimensions of the quartz plate. Utilization of the "piezo-electric effect" is seen in any "crystal controlled" electronic device.

Hence, to produce mechanical motion at frequencies sufficiently rapid for therapeutic Ultrasonics, it is necessary only to provide a quartz plate of the proper characteristics, a holder for the plate and a high frequency oscillator tuned to match the plate frequency. In this word description the process seems simple; in practice it becomes a procedure demanding exact precision and careful craftsmanship.

The quartz plate holder - variously termed "sounding head", "transducer", etc. - presents the initial problem. First, it is obvious that the portion of the "sounding head" which contacts the anatomic area under treatment must possess exactly the same properties of oscillation as the quartz plate to prevent it from absorbing the mechanical motion and damping the total output. This demands material of the proper composition and precise-

fabrication as critical as that required in the preparation of the quartz plate. In addition, the handle portion of the sounding head must be thoroughly damped to obviate undue exposure to the operator.

The optimum frequency, output and current characteristics of the apparatus may be adjudged from the statements of Buchtala published in the British Journal of Physical Medicine, January, 1952: "Using such data and comparing results, it is found that a minimum output of 3 watts per square centimeter (of sound-head contact area) has to be demanded, although a fixed sound-head requires only a fraction of this intensity. In theory it might be possible therefore to work with lower intensities than 3 watts per square centimeter, but the fixed sound-head is not always applicable and modern instruments have a total output of 25-40 watts (total over entire contact area), thus providing for an adequate area of emission. Higher intensities have not proved of any value in clinical practice. Extended investigations have also shown that the frequency of the waves has little effect upon the clinical result provided that it lies somewhere between 300,000 and 1,500,000 cycles per second . . . . The choice between modulated (with rectifier tubes in the oscillator) and unmodulated (without rectifier tubes) has been decided in favor of the former".

Biologic Effects of Ultrasonics

Excerpts from the previously mentioned paper of Dr. Kenneth Phillips, M.D., concisely summarize the biologic effects of Ultrasonic energies: "Extensive research by Europeans; work in process by Rosenthal (Harry Rosenthal), New York City, "Ultrasonics in Clinical Medicine", June 1950) on proteins, minerals, fats, sugars, etc., all reveal evidence of biologic effects other than thermal. Intracellular metabolic effects, analgesia, microcellular vibration, action on nervous, blood and lymph systems have all been included in the biologic survey".

Nelson, Herrick and Krusen in the Archives of Physical Medicine, January, 1950, list the effects of Ultrasonic energy as "mechanical, thermal, chemical, biologic and physiologic".

Thus, several interesting approaches to the biologic effects are presented. It would seem logical to assume that the "microcellular vibration induced by Ultrasonic application should influence membrane permeability and, hence, osmotic interchange of intracellular fluids. This phenomenon, probably, is the basis for Phillip's conclusion of "interacellular metabolic effects".

The analgesic effect of Ultrasonic radiation is brought out in several ways. K. Stuhlfauth, M.D., Medical Clinic of Munich, Germany, in the British Journal of Physical Medicine, January 1952, states: "Ultrasonic therapy often is remarkably successful in introducing analgesia in the persistent and unrelenting pain following upon herpes zoster. We have seen three such cases in which two or three sonations produced freedom from pain previously not achieved by procaine infiltration or even X-Rays".

Additionally, and more recently, Irving Tepperberg, M.D., and Elemer J. Marjey, M.D., respectively chiefs of Physical Medicine Rehabilitation and Physical Medicine Group, Veterans Administration, New York Regional office,

report in the American Journal of Physical Medicine, February, 1953, on the analgesic effects of Ultrasonics in painful post-operative neurofibromas: "Dramatic relief of symptoms was obtained in four of the five patients . . . Ultrasonic radiation appears to have an almost specific action on painful neuromas. There were no harmful effects produced by Ultrasonic radiation in any of our patients".

From this it would appear that the analgesia might be closely associated with both the thermal and mechanical effects of Ultrasonics as cited by Krusen et al. In support of this conclusion Stuhlfauth, in the paper previously reported, says: "The conductivity of isolated nerve muscle preparations is demonstrably altered by Ultrasonic waves. Schmitz showed that the decline in conductivity of a nerve, caused by raising its temperature, is accelerated by increased frequency of impulses." Whether the analgesia is a result of indirect heating of the nerve or the inhibitory action of the rapid mechanical vibration is open to discussion. However, the factor of importance is its proved ability to cope with pain in many conditions.

Effects on nervous, blood and lymph systems are equally well founded and reported by many observers. The summation of A. W. Bauer, M.D., London, is striking: "What is more important, the effect of Ultrasonic therapy is not limited to the region to which it is directly applied. It would rather appear that Ultrasonic impulses invoke neural effects of various types and intensities (remote action). The effects range from simple vasomotor reflexes, resulting in hyperemia or vasoconstriction respectively according to the dosage employed, to changes in the functional state of the autonomic nervous system as a whole . . . It would appear from the work of Tschannen that Ultrasonic waves are particularly effective when applied not only to the affected joint or area but to the governing spinal nerve-roots".

In addition to "good beaming" and "high depth penetration" and the proved effectiveness reported by the many experienced workers in both European and American centers, Phillips summarizes Ultrasonic therapy in a most impressive statement: "I have been unable to find any record, written or oral, where within the intensities prescribed for therapeutic use, anyone has been able to produce tissue destruction without first exceeding the physiological pain threshold. What other physical modality gives the therapist such a safety valve?"

Indications for Ultrasonic Therapy

As in the case with many other forms of therapy, Ultra Sound energies have shown surprising results in some conditions, only fair in others and none at all in some cases. However, the weight of evidence in those conditions for which it is recommended is favorable and conclusive. Perhaps the best approach to the indication for Ultrasonic applications is in a summation of the findings of experienced observers as reported in current literature:

Bursitis, Acute . . . Phillips reports on 10 cases treated, which had previously received heat or injections, and all 10 obtained good results. Tschannen reports satisfactory results in chronic cases and states, further, that disappearance of shadows due to calcification is observable radiographically with clinical effects shown by improved range of motion and freedom from pain. In a survey of the results obtained by European workers, each of whom had treated more than one hundred different cases, Stuhlfauth and Woeber report excellent results in 41.5%; good results in 48%; no improvement in 10.5%.

Rheumatic Disorders of Muscles and Periarticular Tissues . . . Tschannen makes the following interesting observations: "In addition to the principal field of indication - that of the degenerative joint disorders - excellent results are seen in muscular rheumatism, lumbago, torticollis and muscular spasticity of the shoulder-girdle, which is still often called plexus neuralgia. After 4 to 6 soundings freedom from symptoms is usually found". In the Stuhlfauth-Woeber survey the results in Lumbago showed 74% excellent, 25% good and 1% no improvement; for Myalgia the results were 72% excellent, 26% good and 2% no improvement.

Rheumatic Diseases of Degenerative Type . . . Theo De Preux, writing in the British Journal of Physical Medicine, January, 1952, in an extensive monograph titled "Ultrasonic Therapy in Osteoarthritis of the Hip Joint", includes not only the hip joint, but the knee, and the spine as well. The conclusions are well stated in the following excerpts: "In pure arthrosis pain, stiffness and limited mobility react favorably. Of course, Ultrasonic therapy will not improve movements limited by deformities of the bone . . . Osteoarthritis of the spine is also improved by Ultrasonic waves. We consider cervical spondylitis, usually so difficult to influence, especially in its severe form, apt to be greatly improved by extensive Ultrasonic therapy. This improvement applies to pain as well as to active and passive movements in the great majority of cases".

De Preux's observations concerning the hip joint are conservation and best stated in his own words: "Ultrasonic therapy does not solve the problem of osteoarthritis of the hip joint. Its value will be limited in advanced cases with destruction, severe mechanical and static impairments. But for the great majority of cases of osteoarthritis at their onset, and many of the moderate ones, Ultrasonic therapy well applied improves subjective symptoms; relief from nocturnal pain, then from pain in walking".

Acute Trauma . . . In 72 cases involving acute trauma of joints, back and fractured ribs, Phillips summarizes results as good in 52, moderate in 12 and none in 8. Tschannen presents the postulation that Ultrasonics is of value in the after-treatment of fractures, especially in joints. He says; "The fixation of joints which occurs after intra-articular fractures and is caused by muscular hypertony is favorably influenced by Ultrasonic therapy. Because of its simultaneous action on the vascular system, the much dreaded complication of arthrosis may be avoided".

A number of team trainers in the United States have discovered the value of Ultrasonics in treating the contusions and bruises common to athletic competition such as "charley horse", sprains, strains, etc.

Sciatica - Neuritis . . . Buchtala states: "In about 75% of cases freedom from pain is reported after a series of fifteen to twenty applications. Sciatic conditions which do not react to Ultrasonics are usually of the symptomatic type caused by compression of the roots and secondaries . . . Similarly, neuritis of the plexus brachialis reacts as well as sciatic neuralgia".

Tschannen's position is somewhat individual. He says: "True neuritis of the sciatic nerve is a rarity. It is questionable whether the interpretation of Lasegue's sign as eliciting pain by the stretching of the inflamed nerve is appropriate. It seems much more to consist in pain due to stretching of the hypertonically stiffened and reflexly ischaemic muscles. This ischaemia would also explain the parathesia. In such cases, also, radicular Ultrasonic applications produce successful results." In the Stuhlfauth-Woeber survey the results from treatment of sciatica with Ultrasonic therapy are segregated as follows: very good, 55.5%; good, 42%; no improvement, 2.5%.

In summary it can be stated conservatively that Ultrasonic therapy is now sufficiently well established to warrant its inclusion in the physical medicine approach to a number of conditions. Phillips concludes: "The most outstanding therapeutic results of this study have been with traumatic injuries, acute bursitis and low back distress". Tschannen offers a word of sound advice: "Once more, stress must be laid on the importance of making an exact diagnosis. The correct diagnosis, combined with appropriate application and dosage, is decisive in producing an optimal result". Bauer, of London, editorializes: "Most critical authors agree now that Ultrasonic therapy has specific merits primarily in the field of rheumatology. This limitation of ultrasonics is balanced by the recognition that within this limited field it can claim outstanding success".

Most workers concur in the opinion that the known effectiveness of Ultra Sound waves in specific conditions is but a forerunner of far more extensive application as more clinical evidence is accumulated. Phillips summarizes this postulation well in his statement: "Results of this study, together with voluminous reports from European and American scientists, justify an opinion that this energy offers wide future possibilities".

Contra-Indications

The contra-indications for therapeutic use of Ultrasonics are few but specific. It is best perhaps to enumerate them as follows:

The "MUST NOTS"

1. Malignant Tumors of any type
2. The ganglion stellatum in heart disorders or heart instability.
3. The pregnant uterus.
4. The orbit of the eye.

Treatment Methods

There are several methods for administering the Ultrasonic energies. One is termed the "contact" method to describe the application in which the "sound head" is maintained in actual contact with the tissue. It has been pointed out previously that some medium of matter, mineral oil or soap solution, must be used to obviate the cushioning effect of any air layer. So, a generous layer of this substance is spread over the area to be treated and the sound head is in firm contact, in fact with slight pressure, to the area under treatment.

Two variations of the "contact" method have been employed, the "stationary" and the "massage" treatment. In the "stationary" application the "sound head" is held at a fixed point throughout the treatment. In the "massage" application the "sound head" is moved slowly and rythmically around over the entire area of the local involvement.

The exponents of the "stationary" method base their concept on the premise that sounding of certain critical points (Head's zones, spinal roots and ganglia) affects an extensive area or region, such as a joint. However, in the "stationary" method the intensities of dosage, i.e., watts per square centimeter, must be maintained at a much lower level than with the "massage" method.

Exponents of the "massage" method point out that this type of application produces a uniform distribution of energy over the entire treated area and does not require the exactness of beaming necessary in the stationary type of treatment.

Tschannen postulates on the effectiveness of a combined stationary and massage application which he terms "radicular" treatment. In his own words he says: "Of the time expended (treatment duration) two-thirds should be employed for the nerve roots and one-third for the affected joint. The dosage varies, according to the fatness or thinness of the patient, between 8 and 15 watt output for a movable sound-head (massage) or 0.8 to 2 watts for a stationary application". In this connection Tschannen publishes the following table of the nerve roots to be treated for the joints affected:

Affected Joint	Nerve Root
Hip	3rd to 5th Lumbar Vertabrae
Knee	12th Thoracic to 3rd Lumbar
Ankle	1st to 4th Sacral
Shoulder	4th Cervical to 2nd Thoracic
Elbow	4th Cervical to 6th Cervical
Wrist and Hand	5th Cervical to 2nd Thoracic

When the anatomic surface is uneven, as is the case with the ankle or small joints, the sounding may be made conveniently under water. In this case the part to be treated is immersed in a vessel of warm water and the sound-head also is immersed and directed within 1/2" to 1" from the affected joint. The water between the part and the sound-head constitutes the media through which the Ultrasonic waves are conveyed into the tissue.

Dosage

The matter of dosage in the application of Ultrasonic waves probably has been one of the most discussed subjects in this form of treatment. However, in the light of present day knowledge, accumulated in the clinical treatment of many hundreds of cases, the estimation of dosage is not as difficult as it might appear.

First, it must be conceded that due to the character of the involvement, the acute or the chronic; the locale of the affected region, deep-seated or superficial; and the variation in response of the individual, no rigid rule of dosage can be stated. But, this situation is no more unusual than that attending the administration of diathermic therapies in which the tolerance of the patient is the accepted dosage guide.

Two or three principles are well established in the application of Ultrasonic waves. One is that the use of a high intensity for a short time is not as effective as the application of lower intensity for a longer time. Here, again, is a parallel to diathermic treatment. Second, it is well established that chronic conditions require a more vigorous action than acute conditions. Also, since Ultrasound energies decrease in intensity with depth of tissue, deeper seated lesions require a correspondingly greater intensity than superficial involvements. And, finally, the "stationary" method of application demands much less energy than the "massage" type of application.

Buchtala cites probably the most dependable dosage guide in his statement that "the patient by reporting subjective pain determines the permissible limit of dosage. From which it would appear that in Ultrasonic applications, also, the patient's tolerance is the most reliable guide.

A number of experienced users of Ultrasonic energies have rationalized the dosage problem by beginning all treatments with relatively low intensities and gradually increasing in each subsequent treatment until the threshold of pain has been established. This is somewhat similar to the method employed in Ultra Violet irradiations to determine the individual reaction of the patient.

The duration of treatment is flexible. A number of writers suggest 6 minutes per treated area as the optimum. The time is somewhat dependent upon the method employed, i.e., the stationary or massage and whether contact or under water. No ill effects have been reported from treatments enduring as long as 10 minutes as long as the intensity is maintained below the pain threshold.

The frequency of treatment has been reported by various workers as ranging from daily applications in acute and sub-acute involvements to once or twice weekly in chronic conditions. While some acute conditions respond spectacularly to a few applications, the merits of Ultrasonic applications in a specific involvement should not be adjudged until a reasonable number of treatments, even 15 or 20, have been given. It is not unusual for the patient to report a delayed beneficial response several days after cessation of the applications.

In general, Ultrasonic therapy, its application and its dosage should be considered in the same light as other physical agencies. Failure in one or two cases should not constitute total condemnation because too many brilliant successes are a matter of record.

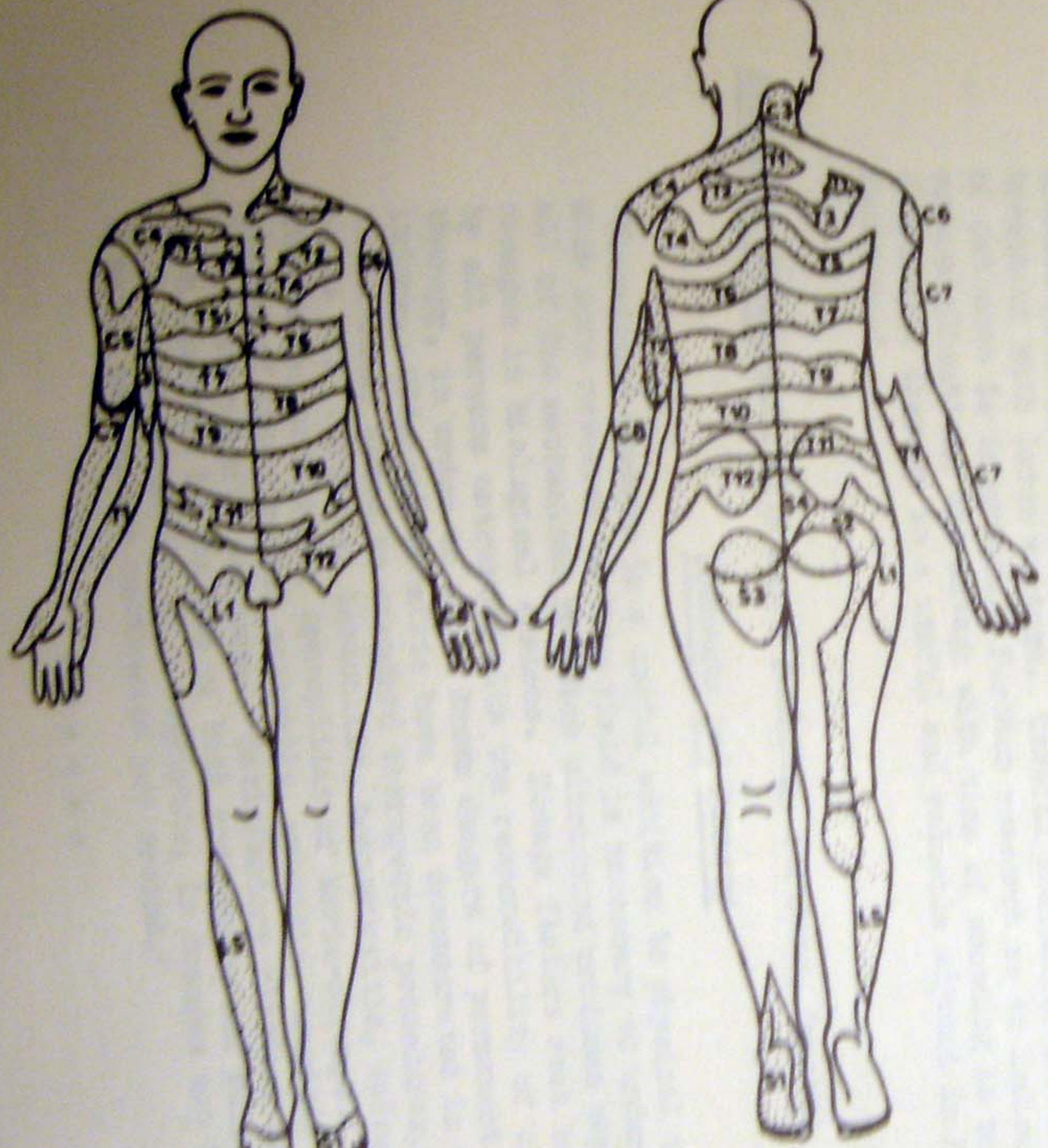
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A FEW TREATMENT SUGGESTIONS

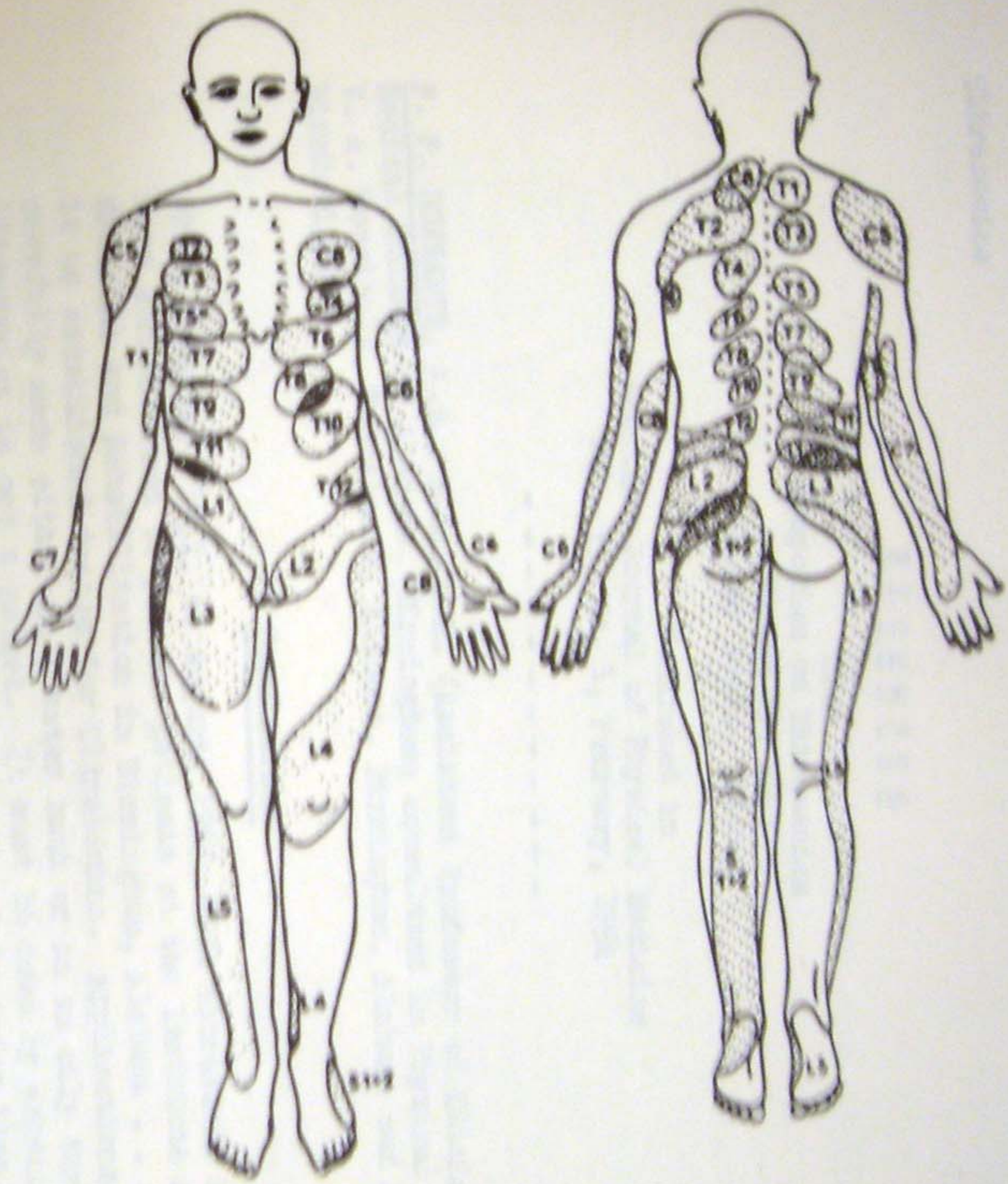
CONDITION	AREA TREATED	DOSAGE W/CM²	DURATION (MINUTES)	RADICULAR TREATMENT PARAVERTEBRAL NERVE SEGMENTS TREATED	DOSAGE W/CM²	DURATION (MINUTES)	COMMENT
BURSITIS	Upper head of humerus and coracoid process, slowly rotating transducer over area 3"x3" point of shoulder and forward over upper bicep.	.5 to 1	4 - 6	C-4 to Th-2 as well as nerve distribution to shoulder.	.3 to .5	4 - 5	Daily in acute stages, then twice weekly. Treat shoulder first and then nerve roots at each setting. It is important that speed of rotation be slow, taking approx. 2 seconds each.
SPONDYLITIS	Paravertebral over affected area.	.3 to .6	6 - 8				Treat 2 adjacent paths on each side with slow straight upward stroke and slow rotating motion downward along the length of the spine affected.
ARTHRITIS (At the onset and Hypertrophic types)	Over affected area in direct contact if area permits or underwater for small joints of feet and hands.	.5 to 1	4 - 6 8 - 10 Under Water	Wrist and fingers: C-5 to Th-2 Elbows: C-4 to C-6 Shoulders: C-4 to Th-2 Ankle: S-1 to S-4 Knee: Th-12 to L-3 Hip: L-3 to L-5	.3 to .5 .3 to .5 .3 to .5 .3 to .5 .3 to .5 .3 to .5	4 - 5	Degenerative joint disorders may require 12-15 sessions and may be resumed after a rest period of 1 to 2 months. Objective is relief of pain & significant restoration of function.
NEURITIS	Over nerve distribution affected.	.3 to .6	4 - 6	Corresponding nerve roots.	.3 to .5	4 - 5	Nerve pathways should be accurately located and used as target of ultrasound application.
SCIATICA	Sciatic nerve at level of gluteal fold and distribution along thigh.	.3 to .6	4 - 6	Root of sciatic nerve (Sacral Plexus)	.3 to .5	4 - 5	Radicular treatment important especially when caused by anatomical changes in the spine including intervertebral discs.
OSTEOARTHRITIS (HIP JOINT)	3 areas aim at the trochanteric and supertrochanteric region. The groin, anterior & posterior aspects.	.5 to 1 (or below level which provokes pain) Rotating motion.	4 min. per area	L-3 to L-5	.3 to .5	4 - 5	Depending on condition of hip joint, at the onset, moderate or severe osteoarthritis, 6-12 sessions may be needed. Objective is to reduce noctural pain, walking pain, restoration of function.
SPRAINED ANKLES	Over the edematous area and tarsus, and around the terminal of the tibia and fibula in direct contact. If discoloration from hemorraghic sprain shows over the phalanges, treat this extremity under water.	.5 to 1	5 - 6				Immediate reduction of pain and of the edema followed by rapid restoration of function.
RHEUMATIC DISORDERS IN MUSCLES AND PERIARTICULAR TISSUES: —Lumbago —Torticollis —Muscular spasticity —Slipped disc —Epicondylitis —Tenosynovitis —Plexus neuralgia —Fibrositis	Apply to hypertonic muscles involved. (Direct contact, slow rotating motion).	.5 to 1	5 - 6	Corresponding nerve roots	.3 to .5	4 - 5	The objective is to diminish muscle tonus and spasticity to an asymptomatic condition, relief of pain and restoration of function.

SUBJECTIVE PAIN REPORTED BY PATIENT SHOULD NOT BE IGNORED, IT IS A SIGN OF TOO HIGH LEVEL OF POWER.

THE TECHNIQUES SUGGESTED ABOVE ARE A COMPILATION OF RECOMMENDED TREATMENTS BY A REPRESENTATIVE GROUP OF PHYSICIANS WHO SPECIALIZE IN THE FIELD OF PHYSICAL MEDICINE AND REHABILITATION. THE TECHNIQUES GIVEN HEREIN ARE INTENDED TO AID THE PHYSICIAN TO FAMILIARIZE THEMSELVES WITH ULTRASONIC TREATMENT; THEY ARE NOT NECESSARILY CONCLUSIVE THE ATTENTION OF THE PHYSICIAN IS CALLED TO THE PARAGRAPH ON CONTRAINDICATIONS CONTAINED IN OPERATING INSTRUCTIONS BOOKLET ACCOMPANYING THE INSTRUMENT.



Segmental extension
of surface sensibility
(incl. surface pain)
(Head)



Segmental extension
of visceral pain
(Lewis and Kellgren)

E X C E R P T S

from
Symposium on Ultrasonics
August 29, 1953
Palmer House, Chicago

Published in
American Journal of Physical Medicine
Vol. 33, No. 1, February, 1954

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F. F. SCHWARTZ, A.B., B.S., M.D. (Assistant Professor of Clinical Medicine, Medical College of Alabama, Birmingham; consultant in Physical Medicine to V. A. Hospitals, Tuscaloosa, Alabama, Birmingham, Alabama and Jackson, Mississippi):

Conclusions

"From November, 1951, to August, 1953, 2911 ultrasonic treatments were administered to private patients at the Institute of Physical Medicine and Rehabilitation in Birmingham, Alabama . . . .There is no established dosage for Ultrasonics. Applications must be carefully made either in a water bath or on an oily surface. Ultrasonics is not a gadget. It must be used by experienced and trained persons. Conservative treatment is safer than heroic treatment with large wattage. Careful evaluation and selection of patients is important. Further research as to indications, contraindications and dosage with time of sounding is necessary. Ultrasonic therapy is a useful and valuable adjunct in Physical Medicine."

ARTHUR C. JONES, M.D. (419 Mayer Building, Portland, Oregon):

Comments and Summary

"Ultrasound therapy is a useful addition to physical therapeutics. Much more research in this field is necessary to understanding all of the mechanisms by which ultrasound produces physiological changes in biological systems. Dosage factors must be observed by all persons entrusted with the responsibility of ultrasonic therapy, in order to avoid known dangers of permanent tissue injury. Clinical benefits have been demonstrated in the use of ultrasound, added to standard therapeutic procedures, in selected cases of: bursitis, tendonitis, tenosynovitis, epicondylitis, rheumatoid arthritis, spondylitis of Marie-Strumpell type, some phases of hypertrophic arthritis, myositis, neuritis and radiculitis and painful neuromas. Satisfactory clinical results have been observed in the use of both continuous and pulsed ultrasound at a basic frequency of 1 megacycle, in dosages not to exceed 3 watts per square centimeter per second."

* * * * * *

H. J. BEHREND, M.D. and JEROME WEISS, M. D. (New York City):

Summary and Conclusion

"We have presented a resume of our clinical experience with this new method of treatment. We do not present extensive statistics, one can prove or disprove anything with statistical evidence. We feel that our clinical experience based on 6000 treatments given over a period of three and one-half years is consistent with the following conclusions. Ultrasonic therapy is a valuable form of treatment which is not dangerous within the therapeutic limits of accepted dosage in competent hands. Further investigation along the lines which we have indicated will undoubtedly establish firmly the value of ultrasonic therapy in geriatrics".

* * * *

LT. COL. JOHN H. KUITERT, M. C. (Brooke Army Hospital, Fort Sam Houston, Texas):

Conclusion

"Objective findings were relief of pain associated with increased range of motion of the affected segment and the peripheral joints innervated at the level of treatment. Side effects of ultrasonic energy appeared to be a nonspecific stimulation of the autonomic nervous system with local and general reactions which appeared rapidly and presumably traverse neural pathways. These reactions depended on the dosage employed and stationary sounding over a specific spinal root or segment. A conservative, calculated approach to ultrasonic therapy is indicated in selected pain syndromes associated with spinal root irritation of the mechanical type. The clinical efficacy of small doses of ultrasonic energy suggests that mechanical stimulation of the neural pathways may be the modus operandi in this form of treatment".

* * * *

JEROME W. GERSTEN, M.D. (Department of Physical Medicine and Rehabilitation, University of Colorado School of Medicine, Denver, Colorado):

Summary

"Good clinical results with ultrasonic energy have been reported by many workers in the treatment of muscle pain and spasm associated with fibrositis, osteoarthritis, scapulo-humeral periarthritis, slipped intervertebral disc, and similar disorders. On the average, good to excellent results were obtained in fifty to sixty percent of the patients with fibrositis, while fifteen to thirty percent were unimproved. There were fewer superior results in the treatment of osteoarthritis, with only thirty to thirty-five percent falling into this category. Accurate comparison of results with ultrasound and with other forms of therapy have been difficult to make. There is, thus far, neither

(Jerome W. Gerston, M.D., continued)

clear cut superiority nor inferiority in comparison with previously used technics. The value of ultrasound, at the moment, therefore lies in supplementing other forms of therapy for muscle disease. As far as the mechanism of action is concerned, there is evidence in the experimental animal that generalized heating of tissue, localized heating at interfaces, and non-thermal factors may all play a role in the effects noted in muscle and nerve after exposure to ultrasound. Though good clinical results have been obtained both with direct application over the involved muscle, and with radicular application over the appropriate nerve roots, there has been, thus far, no satisfactory evaluation of the two technics".

* * * * * * *

BRUCE B. GRYNBAUM, M.D. (Assistant Professor of Clinical Physical Medicine and Rehabilitation, New York University Medical School; Director of Physical Medicine and Rehabilitation, Department of Hospitals, New York City, New York):

Conclusions

"A preliminary report is presented of one hundred cases treated with Ultrasonics. It is our impression from this series that this mode of treatment is of value in relieving pain and secondary muscle spasm of acute bursitis of the shoulder. Included in the above study are some observations on a series too limited in number to draw any final conclusions on the effect of Ultrasonics on other pathologic states. It is our intention to broaden the scope of this study. We fully realize that only prolonged clinical observations from many different medical centers can establish the true value of this new physical modality".

* * * * * * *

JOHN H. ALDES, M.D., F.A.C.S., WALTER J. JADESON, B.S., R.P.T., and SEVERIN GRABINSKI, R.P.T. (Department of Physical Medicine and Rehabilitation, Cedars of Lebanon Hospital, Los Angeles, California):

Summary and Conclusions

"The present study is concerned with the clinical evaluation of a relatively new form of therapy. The methods and technics employed are described and the effectiveness of ultrasonic therapy is substantiated by means of statistical tables. A master chart serves to illustrate all results obtained during this study. Ultrasonic therapy does not only relieve pain and improve mobility but often also results in decrease of dissolution of calcifications, as demonstrated by roentgenograms. The response to ultrasonic radiation takes place more promptly in acute cases of subdeltoid bursitis, while chronic cases require longer and more intensive therapy. If calcareous deposits are present,

(John H. Aldes, M. D. et al, continued)

stationary treatment of the central portion of the deltoid muscle, directly below the acromial process, is of advantage. In the majority of patients, signs of improvement become apparent after four to six ultrasonic treatments. The range of motion is increased, and the tenderness and pain disappear gradually. A minimum of six treatments was given in each case. Even in the group of patients who had not obtained any, or only questionable improvement, and were classified under Grade 0, there were no ill effects from sonations. Undoubtedly, many cases of subdeltoid bursitis can be successfully treated by conventional methods. However, ultrasonic radiation would seem to be a more efficient means of alleviating pain and tenderness and restoring complete shoulder motion. Ultrasonic therapy, furthermore, shortens the duration of disability. In our opinion, ultrasound is not a substitute but rather an addition to the other modalities employed. A combination of ultrasonic radiation with other conservative methods has proved especially effective when patients failed to benefit from conventional treatment or ultrasonic therapy alone. As a result of the present study, ultrasound in combination with other modalities is now the procedure of choice in all cases of subdeltoid bursitis, resistant to other forms of conservative treatment".

* * * * * *

Use of Ultrasonic Radiation in the Treatment of Subdeltoid Bursitis With And Without Calcareous Deposits*

JOHN H. ALDES, M.D., F.A.C.S.
THOMAS KLARAS, B.S.
LOS ANGELES, CALIFORNIA

From the Department of Physical Medicine and Rehabilitation, Cedars of Lebanon Hospital

ABSTRACT

For the past three years, a clinical investigation has been made in the use of ultrasonic radiation in medicine. This clinical investigation was primarily on the use of this type of radiation in osteoarthritis.

During the past two years our investigation has included the use of ultrasonic radiation in the treatment of subdeltoid bursitis, with and without calcareous deposits.

We have compared this type of treatment with the conventional therapy for this condition and found the results are more effective with the use of ultrasound.

In this presentation we bring out the technical and therapeutic aspects of ultrasonics—the treatment procedures and their results of 210 cases treated with ultrasound that we have followed over a period of two years.

For many years subdeltoid bursitis, which has various synonymous titles, such as painful shoulder, subacromial bursitis, calcified bursitis, periarthritis, calcareous tendinitis and so forth, has been treated by many different methods. This particular condition has always been regarded as a difficult therapeutic problem; and whether chronic or acute, and with or without calcareous deposits, the types of therapy used were in line with medical progress at that time. The conventional therapies used for treatment were short wave diathermy, microtherm, electrotherapy, radiant heat, hot packs, novocain injections with hot saline flushes, roentgen therapy, and in some cases even surgery.

In 1938, when the senior author (J.H.A.) clinically evaluated all bursitis therapy known at that time, the conclusion reached was that diathermy or roentgen therapy were the most beneficial. Until the present time, little progress has been made in treating this condition.

During the past four years in the Department of Rehabilitation and Physical Medicine at the Cedars of Lebanon Hospital, we have conducted an investigation, both in clinic and laboratory, into the use of ultrasonic radiation for various diseases and disabilities.[1-3] Our early results showed that the physiological and biochemical effects of ultrasonic radiation were beneficial to many of the chronic orthopedic and neurologic conditions.

In December, 1950, ultrasonic radiations were given to a small controlled group of subdeltoid bursitis cases in order to compare this new modality with conventional forms of treatment. After promising results were obtained, a study on a greater number of cases was initiated in January, 1951, and is continuing at the present time. During this time 228 patients with subdeltoid bursitis, with and without calcareous deposits, were treated, of which 157 could be fully evaluated for the first two years. A preliminary report on this study was presented one year ago.[4] Since then we have treated another group of 58 patients, making use of the experience which we had gained in our initial study. Of this last group,

* Read before the Southern California Chapter of the American College of Surgeons, Santa Barbara, California, February 6 and 7, 1954.



Diplomate, American Board of Orthopaedic Surgery; Fellow, American College of Surgeons, American Academy of Orthopaedic Surgeons; Director, Department of Rehabilitation, Cedars of Lebanon Hospital; Chairman, Multiple Sclerosis Clinic, Cedars of Lebanon Hospital; Member, Medical Advisory Board of the National Multiple Sclerosis Society; Consultant, City of Hope Hospital, Duarte, California; Chairman, Western Section, American Congress of Physical Medicine and Rehabilitation; Member, numerous national and local Rehabilitation Committees. Formerly, Chief of Orthopedic Surgery and Chief of Rehabilitation, Birmingham Veterans Hospital, Van Nuys, California. Lt. Colonel, United States Army Medical Corps, Chief of Orthopedic Surgery and Rehabilitation during World War II.

53 could be evaluated. We are now presenting our total results and conclusions on the 210 cases we were able to follow for at least three years.

Technical and Therapeutic Aspects of Ultrasound. Ultrasonic waves have a frequency above that of audible sound and are usually produced by the piezoelectric crystal method. The ultrasonic generator consists mainly of a high-frequency circuit, an oscillator circuit, and a quartz crystal which is the integral part of the hollow metal applicator. By exposing opposite sides of the quartz crystal to an alternating electric field, the crystal is caused to vibrate, and the resulting ultrasonic vibrations are transmitted to the front plate of the treatment head. Ultrasonic waves will not travel through a vacuum, and transmission through air is ineffective. A coupling agent, such as an oil of high viscosity, or

Figure 1





Figure 2

Fig. 1. Showing anatomical areas and position of patient for application of ultrasonic radiation.
Fig. 2. Direct method of application of ultrasonic radiation.

water is, therefore, necessary between treatment head and the area to be treated.[1-7]

At the optimal frequency of 800,000 or 1,000,000 cycles per second, a layer of tissue two to six centimeters deep may be reached by ultrasonic waves. The effect decreases with depth because of reflection, refraction, or absorption in the tissues. Important factors are the coupling medium, the absorption coefficient of the specific tissue, and the ultrasonic intensity applied.

Very high intensities may greatly affect the molecular structure of the tissues and cause damage or even necrosis, as demonstrated in animal experiments. The Arndt-Schultz principle holds true, that weak stimuli excite living processes, while strong stimuli are destructive. Consequently, only low intensities were used in our evaluations but the energy produced was, nevertheless, considerable.[1,9]

Most important among the numerous biochemical, biophysical and physiological effects of ultrasonic radiation is the powerful micromassage to which the cellular tissues are subjected. These mechanical vibrations increase active blood supply, influence the sympathetic and parasympathetic nervous system, stimulate metabolism, and produce an analgesic effect. Frequently the skin becomes hyperemic. A significant secondary thermal effect is observed, comparable to that of local short-wave diathermy.[8,10,11]

Further results include degassing action and intensification of gas exchange through increased membrane permeability; breaking up of tissue deposits and promotion of their absorption; acceleration of lymph flow; destruction of bacteria; and changes in blood chemistry. These and numerous other physical and biological effects cannot be separated, but they all play a certain role in improving mobility and relieving pain.[1,7,10,11]

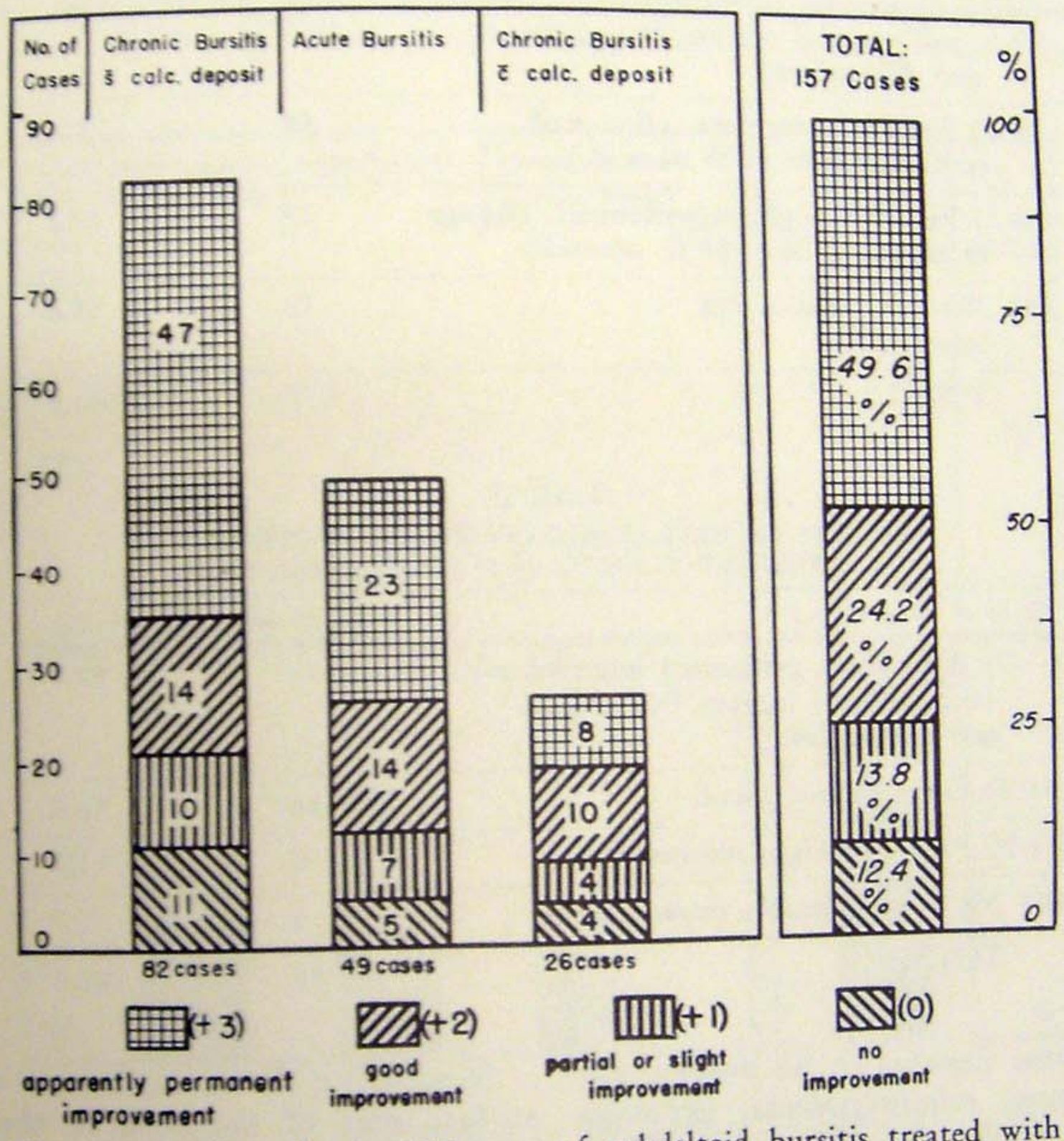


Chart I. Total results in 157 cases of subdeltoid bursitis treated with ultrasonic radiation.

We are all familiar with the anatomical position of the subdeltoid bursa and the pathological conditions in the various stages of

bursitis, as well as the accompanying objective and subjective findings.[12-14] In treating subdeltoid bursitis with ultrasonic radiation, we find that it produces a powerful and deep micromassage, exerts localized thermal action, and increases intracellular metabolism; it causes exudates and precipitates to be absorbed and tissue deposits to be broken up; it loosens tissues, relieves edema, decreases hypertonicity of the muscles, and produces a local analgesia causing an immediate relief of pain.[3,4,7]

Treatment Procedures. Prior to the application of ultrasonic radiation, it is important that in addition to the physical and laboratory examinations, x-rays be taken of the cervical spine and shoulder joint to rule out any contraindicated pathology and confirm the possibility of a calcareous deposit in the subdeltoid bursa.

In applying ultrasonic radiation for the treatment of subdeltoid bursitis, the area to be radiated is divided into three zones: (1) the cervical region; (2) the suprascapular region; and (3) the deltoid area.

In our application, we follow the radicular and neurotrophic technics of Tschanmen, and Stuhlfauth[15] in which we sonate not only the local area of the subdeltoid bursa, but also the nerve roots of the cervical plexus.

Table I

TOTAL RESULTS AFTER USING COMBINATION THERAPY FOR ALL (0) AND (+1) GROUPS

Grade of improvement	No. of cases	Per Cent
(+3) Apparently permanent improvement. (full range of motion, loss of pain and discomfort)	82	52.2
(+2) Good improvement. (Range of motion at least 80% normal.)	44	28.0
(+1) Partial or slight improvement. (Range of motion at least 50% normal.)	19	12.2
(0) None or questionable improvement	12	7.6
TOTAL	157	100.0

Table II

RESULTS OF ULTRASONIC COMBINATION THERAPY IN SUBDELTOID BURSITIS IN 53 ADDITIONAL CASES

Grade of improvement	No. of cases	Per Cent
(+3) Apparently permanent improvement. (full range of motion, loss of pain and discomfort.)	28	52.8
(+2) Good improvement.	16	30.2
(+1) Partial or slight improvement.	6	11.3
(0) No or questionable improvement.	3	5.7
TOTAL	53	100.0

In sonating the cervical roots, we place the surface area of the head of the transducer paravertebrally, just adjacent to the transverse processes.

The next region to be treated is the suprascapular and trapezius muscle area, following which radiation is applied to the entire deltoid muscle group with emphasis on the subacromial region. We then radiate down to the insertion of the deltoid muscle (Fig. 1). In our experience we have found that the best position for the patient for the application of ultrasonic therapy is to place him in a sitting, relaxed, kyphotic attitude of the cervical and upper dorsal area.

A coupling agent of heavy liquid petrola-

rum is used and is applied generously over the skin area to be radiated as well as over the source of energy, which is the flat surface of the head of the transducer. Firm contact must be made between the flat surface of the transducer and the skin, and radiation is applied with a gliding or massage technic, using slow circular movements of the sound head. A distance of not more than 20 cm. is covered in one minute, and this procedure is repeated until the entire surface to be treated has been reached (Fig. 2).

The frequencies we used were either 800,000 or 1,000,000 cycles per second and the intensities of 0.4 to 1.5 w/cm.^{2} The intensity used for the first few applications was between 0.4 and 0.8 w/cm.^{2} After the first three sonations, the patient's symptoms were reevaluated and the intensity adjusted accordingly. Whenever there is no improvement in the patient's condition, yet no increase of pain, a higher energy output is advisable. On the other hand, if the pain has increased, the energy output must be reduced. The intensity never exceeded 1.5 w/cm.^{2}

Subdeltoid bursitis should be treated by low intensities; high intensities in the majority of cases not only produce little beneficial effect, but may aggravate the condition. Low intensities applied with good technic and proper precautions seldom create a painful reaction.

Usually the patient experienced a temporary flare-up of pain a few hours after sonation, and as a precaution it was best to supply the patient with a pain-relieving drug. In our experience, such a reaction was usually a sign that the patient would benefit more quickly than if no pain had occurred. As a rule, such flare-ups of pain disappeared after a short while. Pain occurring during radiation is an indication that either the intensity is too high, or that insufficient coupling agent is being used.

The duration of time for each sonation was usually from three to five minutes over each

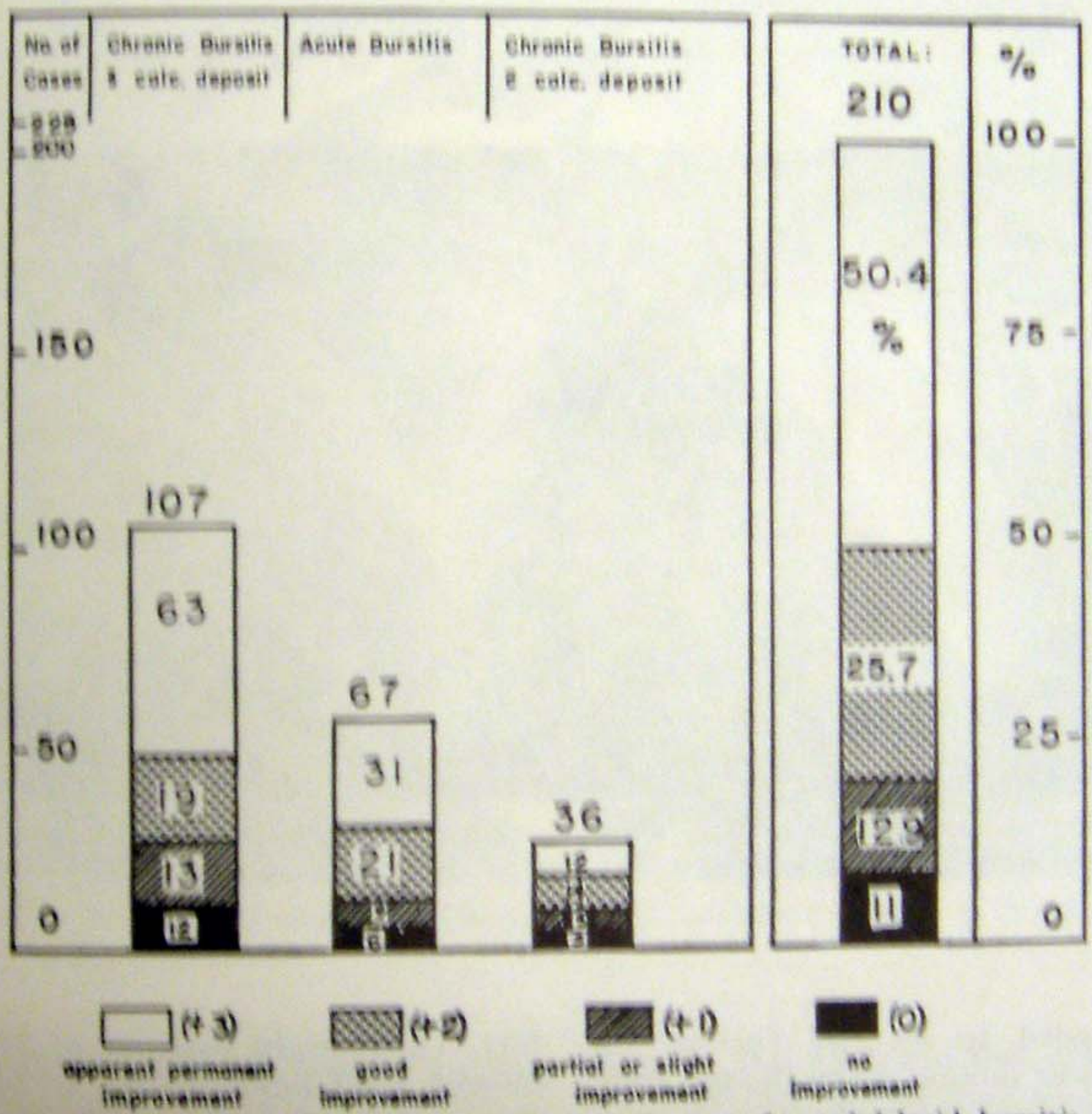


Chart II. Results of ultrasonic radiation therapy for subdeltoid bursitis in 210 cases.

of the three anatomical areas. In the acute cases, sonation was given daily; in the chronic, every other day. It has been our experience that a minimum of six sonations is required before beneficial results can be expected, but a full course generally consisted of nine to twelve treatments.

A rest period of two weeks followed the first series of sonations, and if symptoms persisted, which was rare, a second series of six sonations was then given. If necessary, a third and even a fourth series was administered after rest periods between each series.

Although in our series the majority of our patients received dramatic relief from pain and experienced a steady increase in the range of motion in their shoulder after only a few sonations, we still advised a program of home exercises designed to increase further the range of shoulder motion. Even though additional soreness may have resulted, such exercises were invaluable in preventing residual stiffness of the shoulder. But important as they may have been as an adjunct to ultrasonic therapy, exercises by themselves would not have improved the condition.

In the treatment of subdeltoid bursitis with calcareous deposit, stationary sonation was applied, in addition to the gliding technic, directly over the area where the deposit occurred. For the stationary application, both intensity and duration were greatly reduced, and only 0.1 to 0.25 w/cm.^{2} was administered for a period of one to three minutes.

RESULTS

In our series, 70 per cent of all patients had been previously treated by conservative methods such as infra-red heat, hot packs, diathermy, microwave, saline flushes and roentgen therapy without satisfactory results.[16] Beside using this group as a control, we took another group, similar in every respect, and repeated the conservative treatment in order to compare our results (Chart I).

In our first series of 157 cases which we have been able to follow for at least two years after their last radiation, 78 patients, or 49.6 per cent, showed apparently permanent improvement (+3). These patients had a full range of motion and loss of pain and discomfort. Thirty-eight patients, or 24.4 per cent, showed good improvement (+2), and these showed loss of pain and discomfort and at least 80 per cent of normal range of motion. There were 21 patients (13.8 per cent) who showed partial or slight improvement (+1), and these individuals, although having no pain or discomfort, still had a range of motion of only 50 per cent of normal. There were 20 patients, or 12.4 per cent, who showed no, or questionable, improvement (0). In our first series of cases of chronic and acute subdeltoid bursitis, with and without calcareous deposit, we were able to show that 116 patients, or

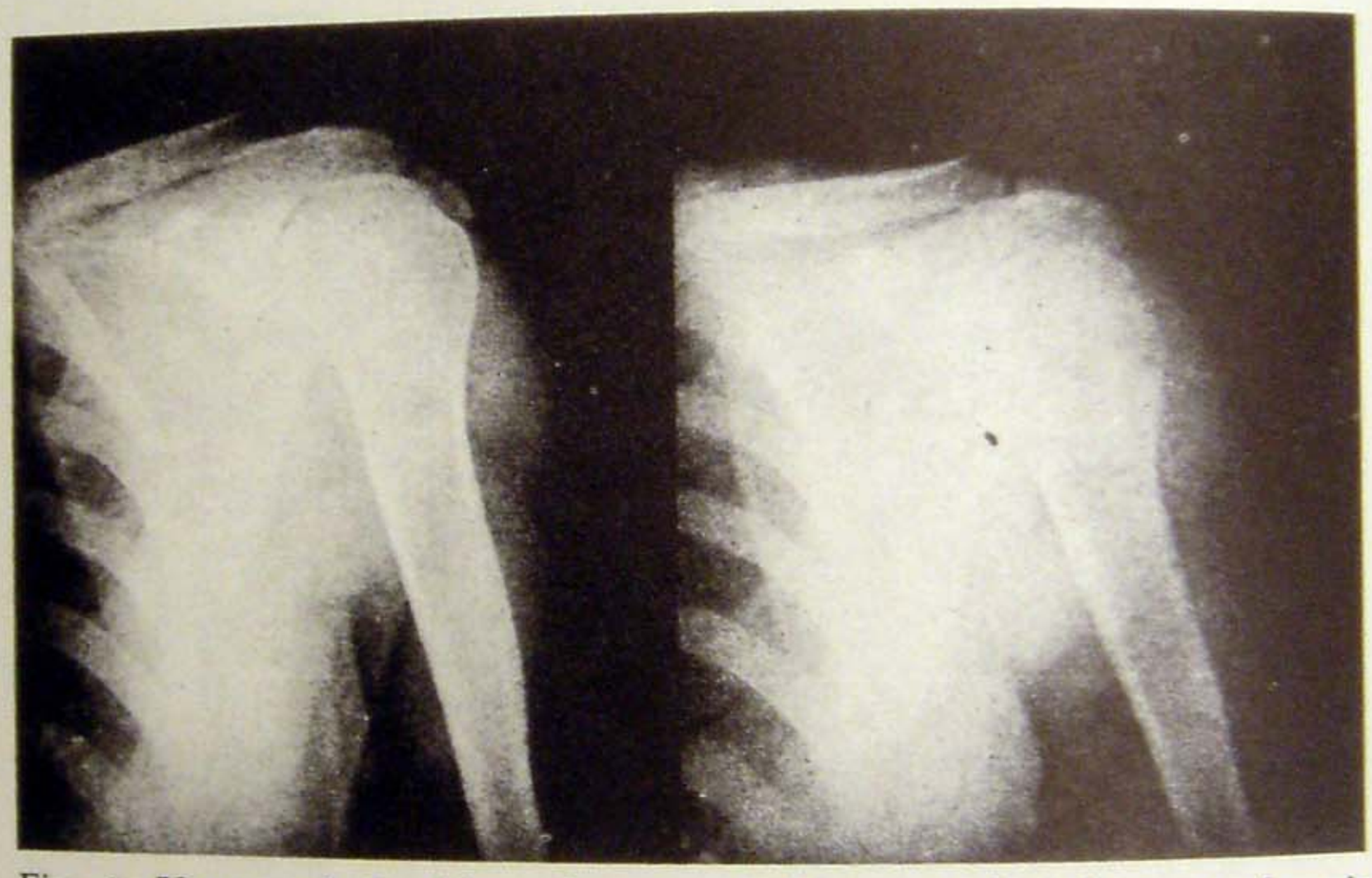


Fig. 3. X-rays of shoulder; chronic subdeltoid with calcareous deposit before and after ultrasonic radiation.

73.8 per cent, showed apparently permanent or good improvement, and 41, or 26.2 per cent, showed partial, slight or no improvement.* Of the 41 patients who obtained little or no improvement from either ultrasonic or conventional therapy, 35 were given another series of ultrasonic treatments, starting and terminating the treatment this time with infra-red heat, or hot packs when muscle spasms were present. These patients who had reacted poorly to conventional or ultrasonic therapy when either one of these forms of treatment was given independently, showed that good results could be achieved by a combination of these treatments.

By recalculating our statistics following the combination therapy in this small group, we were able to raise our permanent or good improvement from 78.8 to 80.2 per cent and thus lessen our partial or slight improvement to 19.8 per cent (Table I).

In continuing our series by adding 53 more patients and using a combination therapy of ultrasound with infra-red and hot packs we were able to show a further increase to 83 per cent in our permanent or good improvement group with only 17 per cent experiencing partial or slight improvement (Table II and Chart II).

In our group of 210 patients, there were 36 who had subdeltoid bursitis with calcareous deposit. Of this group of 36, 48 per cent showed either complete disappearance or decrease of the calcareous deposit following ultrasonic therapy. Our findings indicate that no constant relationship exists between the decrease or disappearance of calcareous deposit and improvement of symptoms of bursitis (Fig. 3). Most patients experienced relief after the deposit had been reduced



Fig. 4. X-ray of shoulder showing chronic subdeltoid bursitis with calcareous tendinitis.

(Fig. 4), but we found that ultrasonic radiation may be effective even when the deposit failed to show any response.

SUMMARY

1. This study was concerned with the clinical evaluation of ultrasonic therapy compared with the conventional types of therapy for chronic and acute subdeltoid bursitis with and without calcareous deposits.

2. A brief discussion was presented as to the physical, physiological and biochemical properties of ultrasonic radiation.

3. Methods and technic of application of

ultrasonic radiation in the treatment of subdeltoid bursitis were explained.

4. Statistical data were presented showing the results obtained in 210 cases over a three year period.

5. Conclusions of this study showed that this new form of therapy (ultrasonic radiation) not only was more effective alone than conventional forms of treatment, but in combination with conservative methods proved most effective.

6. In treating these 210 patients we gave over 5,040 sonations and we did not note any ill effects to the patient or any adverse pathologic changes in the repeated blood, urine and x-ray examinations.

7. As a result of this study, it is our opinion that ultrasonic radiation alone, or in combination with other conventional methods is the procedure of choice for the treatment of subdeltoid bursitis, with or without calcareous deposit.

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Reprinted from
The Western Journal of Surgery, Obstetrics and Gynecology
Vol. 62, pp. 369-376, July, 1954
PRINTED IN U.S.A.

ULTRASONIC THERAPY:

A Review of Its Present Status and Future Possibilities

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Miami, Florida

Introduction

Sales resistance to change or something new, is an inherent characteristic of the human race. The psychology of man is so constructed that his first impulsive reaction to something new is "what's wrong with it?". Clinicians are not exceptional; in fact, they are sometimes dogmatic in opinion regardless which side of a question they choose. We may, therefore, logically anticipate that ultrasonic energy will undergo a considerable mental and verbal mauling while it is gaining its birthright.

High frequency sound energy is not new. Wood and Loomis (1), two American physicists, reported biological studies with it in 1927. Industrially, ultrasonic energy is being applied with increasing magnitude; but its application to diagnosis and therapy has been slow and comparatively recent. Wide study and reports by recognized scientists in Europe, and those now appearing from American investigators, supply discussions and cases running into thousands, and justify some evaluation and conclusions.

The scope intended here will cover: (1) A brief outline of the clinical physics, and technical phases; (2) Accepted biological effects; (3) Clinical application and case studies; and (4) Imparttal discussion with references covering significant phases of the subject.

Physics and Technical Phases

Therapeutic ultrasound waves are a special kind of acoustical energy, much higher in frequency than audible sound. They are produced in, and emitted from, a transducer or soundhead in which is anchored a section of quartz cut in a special way from a large crystal of natural quartz. Quartz possesses piezoelectric qualities when placed in a high frequency electrical field, and in turn emits ultrasonic vibrations from the soundhead. Ultrasonic waves will not travel in air, and can be transmitted only through solid or liquid material, technically called a "Coupling". They can be "beamed" although they are not radiation in the sense of x-ray or radium. The energy is not electrical, and not chemical, although it is believed that chemical reactions are accelerated by ultrasonic application.

Soundheads of different instruments may vary in size, shape, crystal dimensions, etc., but the underlying principle is the same. Actual energy output to the part treated, however, may be different depending upon the engineering design of the soundhead and crystal dimensions. Instruments used in our work (Lindquist Chronosonic) are designed to operate at a frequency of 920 kilocycles per second, with a crystal area of eleven square centimeters. The actual contact area of the soundhead is somewhat larger than the crystal. Total power output of pulsed acoustic energy is adjustable in 10 steps of control, from 1/4 watt to a maximum of 12 watts.

Technical application of the transducer is not complicated. Coupling with oil or water between the soundhead and skin is essential since the slightest column of air will prevent transmission of the energy. Extremities and irregular areas lend themselves to treatment under water, during which the face of the soundhead is immersed and kept in motion about one-half inch from the skin. Two applications have been advocated; stationery, and movement method. The latter only (slow rotary, stroking, etc.) is used by the author.

Biological Effects

Because ultrasound is a new and different therapeutic energy, one expects variation in opinion relative to its biological effects. However, I see no justifacation for the "alarm reaction" and the brand of "danger" tacked on by a minority group of workers. Certainly it goes without emphasis that anyone using or working with this energy should be thoroughly grounded in its fundamentals. I have been unable to find any record, written or oral, where within the intensities prescribed for therapeutic use, anyone has been able to produce tissue destruction without first exceeding the physiological pain threshold. What other physical modality gives the therapist such a safety valve? Full cognizance is given current experimental work at higher intensities on mice and other anaesthetized animals; but to date, in the hands of capable workers, and within the therapeutic dosage advocated by leading authorities, there is no reason for considering ultrasonic energy "dangerous and unsafe". Extensive reports from leading authorities presented at the 3rd. International Congress at Bad Ischl (recently translated in English) (6), DeForest et al (7), Licht (14), and Lehmann & Herrick (8) studying effects on tissues in small animals, offer wide information relative to the safety problem.

Many biological effects of ultrasonic energy are now known. That it offers "good beaming" and "high depth penetration", is apparently accepted. High absorption in muscle as compared to fat, give it advantage over present modalities, and bone can be penetrated. Research opinions differ relative to the thermal element of ultrasonic energy. Schwan and Carstensen (2), in a brilliant report, evaluate the thermal factor; while European scientists of renown,

Van den Bosch (3), Pohlman, Stuhlfauth, Buchtala, Tschannen, and others (4) clearly open the gate for an opinion that heat as such is an indirect, and clinically speaking, probably a minor factor. Zach of Vienna (15) has concentrated a part of his studies on the athermal effects of this energy; and certainly water placed on the soundhead can be vaporized, but the vapor is cold - not hot steam.

Extensive research by Europeans; work in progress by Rosenthal (5), in New York, on proteins, minerals, fats, sugars, etc., all reveal evidence of biologic effects other than thermal. Intracellular metabolic effects, analgesia, microcellular vibration, action on nervous, blood, and lymph systems have all been included in the biologic survey.

The specific behavior of ultrasonic reflections in relation to density of tissue, has initiated studies of this energy as a diagnostic agent. Results at present are empirical.

Clinical and Treatment Application

Many clinical entities have been treated with ultrasonic energy. (4) (5) (6) (8). Results reported have varied, but in the overall have been encouraging. From the vast clinical literature surveyed, a grouping or classification of diseases is difficult. Arbitrarily, however, it is helpful to consider acoustical energy as applied to three large groups: 1. Clinical conditions which involve the autonomic nervous system, including peripheral vascular disease; 2. those engendering bone and joints, (arthritides, radiculitis, discs, and acute trauma); and 3. distress and pain syndromes involving bursitis, neuralgias, neuritis, fibrositis, and functional low back distress. Miscellaneous conditions under study, and more specific than this grouping will not be included in this report.

TABLE I

CONSTRUCTED TO PRESENT SUMMARY PICTURE OF SEVERAL DISEASES TREATED WITH ULTRASONIC ENERGY.

Clinical Group	Total Cases	Sex	Age--Range in years	Duration of Complaint	Previous Therapy	RESULTS: None	Moderate	Good
Autonomic Nervous System								
Bronchial Asthma	3	F-3	17 to 50	8 to 20 years	Conventional all failures including ACTH, etc.	1	1	1
Circulation Disorders Legs - Skin - Ulcers	10	M-4 F-6	61 to 86	6 Mos. - 5 yrs.	None - Routine - Some surgical	2	4	4
Gangrene Toes	5	M-2 F-3	39 to 62	3 wks. - 1 yr.	Conventional all failures	1	1	1
Bones and Joints								
Acute Trauma: Joints, Back and Fractured Ribs	72	M-52 F-20	17 to 46	2 hrs. - 2 wks.	None to usual first aid	8	12	52
Radiculitis	10	M-6 F-4	27 to 42	2 mos. - 6 mos.	Various including ACTH	4	3	3
Arthritis: Rheumatoid Osteo, and Mixed Types	130	M-38 F-92	41 to 78 Aver.55	5 to 40 years	92% failures with modern therapy including Cortisone, ACTH and B 12	77	38	15
Disc Syndrome	0					0	0	0
Disc Syndrome Van Went, Amsterdam, Holland	34	M-10 F-24	18 to 61	Not Reported	Not Reported	2	-	32
Pain and Distress Syndromes								
Acute Bursitis	10	M-9 F-1	32 to 51	24 hrs.-5 days	Injection - Heat	-	-	10
Chronic Bursitis	5	M-4 F-1	27 to 43	1 yr. - 8 yrs.	Various - X-Ray - Needling	2	3	-
Myofibrositis	20	M-11 F-9	31 to 47	2 wks. - 1 yr.	Multiple	5	10	5
Low Back Distress - Functional	22	M-14 F-8	28 to 53	3 hrs. - 1 wk.	Indefinite	4	3	15
Neuralgias - Neuritis, Herpez Zoster	5	M-2 F-3	32 to 55	5 days - 3 yrs.	Indefinite	5	-	-
Multiple Sclerosis	2	M-1 F-1	32 to 65	2 - 7 yrs.	Usual Routine	2	-	-

A definite technique of application and dosage was established from the beginning, and was applied in all cases, regardless of group, with the exception of two rules applied to any individual case. 1. When local distress was manifest, intensity was reduced; 2. in acute conditions, if aggravaion resulted, then both intensity and duration of treatment was reduced. Coupling used was either oil or water, only movement or rotary technic was used, treatment time to each area eight to ten minutes daily, or three times or twice weekly, depending upon the severity of the complaint. Total number of treatments varied with clinical response and ranged from three to fifteen. In Arthritis, one-third of the treatment was given over the spinal area supplying the nerve roots to the peripheral parts affected, and two-thirds to the joint areas themselves.

Cases Studied

The clinical study was carried on in two separate departments with trained operators in each. Individual evaluations were tabulated by operators, then the aggregate surveyed between supervisor and patient, and lastly a final analysis and ratio breakdown of results.

A total of 294 cases have been treated over a period of nine months. Ages ranged from fourteen (only three between fourteen and twenty) to eighty-six years. The majority fell between forty and sixty-five years. Average number of treatments per patient was eight; significant mostly in justifying therapeutic safety, since in the total of 2,352 treatments given, not one severe local or systemic reaction occurred. Sex represented 123 males, 171 females.

Table No. 1 is constructed to summarize significant clinical data and results. It is recognized that when evaluation of results is dependent upon objective and subjective measurements by both patient and physician, a margin of uncertainty must exist. However, with the system of independent recheck established, it is felt that an accurate trend is shown by the method selected in rating improvement as none, moderate, or good.

General Discussion

Table No. 1 presents an aggregate picture, the results column of which forms only a part. Challenge on certain points is anticipated, and elaboration is indicated in attempt to further clearify the table as a whole. The objective of the study and report must be comprehended. Our purpose is an attempt to evaluate ultrasonic energy as a new and different therapeutic agent in clinical medicine; and not to test its function against any one specific disease or complaint. This supplied the reason for reporting on only a few cases in certain complaints. A trend toward positive or negative general value is the motive; not specificity. Additional perspective can be gained by closer detail study of the table with respect to each group. Certainly from a strict scientific viewpoint, three cases of Bronchial Asthma is meaningless; but when one observes the duration of the complaint together with the fact that they were all miserable failures under all previous therapy including ACTH, the complexion changes. Furthermore, Buchtala, Stuhlfauth, and Sholz (4) have reported favorably on a more extensive study in Asthma.

Likewise, in other complaints reported on only a few cases, the entire table must be studied if the significant trend is to be apprehended. The vascular ulcers were all previous failures some of five years duration; and all of the cases of gangrene of foot or toes were ready for surgical amputation when ultrasonic therapy was started. Even the one classified as a failure has not yet gone to amputation (five months), but other emergency measures were instituted and therefore clouded the issue. Study of the age range in the table is significant.

Any criticism for not classifying the arthritic group separately is answered as follows. This was a study in therapy; not etiology. The symptoms demanding relief in this disease are pain, progress of disability, and crippling, regardless of type. The challenge to the therapist is the same in all types, and there is good reason for contending that while we have been spending so much time researching the phases of etiology and types, eight million of these sufferers still remain on the waiting list for symptomatic relief. A first glance at the table revealing 77 failures in 130 cases is not impressive; but further study showing that 92% of the total were complete failures to all modern therapy at the outset, again changes the complexion of interpretation. In other words, we chose the hopeless cripple for the experiment.

In summary, if our study reveals any outstanding value of ultrasonic energy over present established methods of therapy, it would be in acute bursitis, traumatic sprains to joints, and functional low back distress. This statement may bring scientific rebuff from Krusen, Herrick, Lehman et al based on their reports (7) (8) on mice, rabbits, and dogs; but clinically these results have been tested and they are sound. Technical and experienced application in these conditions is emphatically important. A current report by Teppenberg and Marjey (13) is interesting.

With specific reference to intervertebral disc syndrome, it will be noted that we have treated none. However, the reports of studies by Van Went (6) (11) in Amsterdam, Holland are of such importance that they are included in the table. Her studies have been wide and deep; and soon, we are hoping a book under her authorship will be published. Friedland, et al (16), an American pioneer in clinical ultrasonics, treated 29 cases of herniated discs in 1951, with only 4 cases receiving definite relief. Obviously, his study was during early days, and possibly later studies may be more favorable.

Postulation and prophecy relative to ultrasonic phenomena is, of course, intriguing. The minute sonar "pip" on the screen, which meant so much in submarine location during a critical wartime, may well locate a gall stone in the future. The extensive studies of Travell et al (10) on trigger areas and the genesis of pain opens an additional possibility to ultrasound application.

Conclusions

1. Ultrasonic energy, as a therapeutic agent, adds a new modality to present physical equipment.
2. It has been sufficiently tested to assure its safety providing its use is by those properly trained in basic fundamentals.
3. Results of this study, together with voluminous reports from European and American scientists, justify an opinion that this energy offers wide future possibilities.
4. The most outstanding therapeutic results of this study have been with traumatic injuries, acute bursitis, and low back distress. Other conditions have been discussed.
5. As a diagnostic agent, studies are empirical but indicate possibilities of much future value.

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Read before the annual meeting of the Florida Medical Association at Hollywood Beach, Fla. April 26, 1953.

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April 2, 1954

A D I S C U S S I O N
of the
P R E S E N T S T A T U S O F U L T R A S O N I C S

Further evidence of the potency of Ultrasonic therapy accumulates almost daily. It is becoming more and more apparent that this is a modality here to stay. Unfortunately, there has been so much aimless talk already about this energy that more confusion than understanding and more doubt than conviction has been created.

From the imposing lists of diseases benefited by Ultrasonics, ranging from warts and boils to tuberculosis and stomach ulcers which some manufacturers are circulating to exploit their product, it would almost seem that Ultrasonic energy is not a mere modality but rather a complete system of therapy in itself.

Doctors spend many years and much money to qualify for their degrees. Then, more years are spent in practice proving those measures which are dependable. Would it not appear that these years and that money were expended to little avail if with any simple device everything from dandruff to bunions could be cured, as if by magic, as some present exploitation of Ultrasonics would seem to imply.

There are, however, three or four conditions in which Ultrasonics has demonstrated its effectiveness as the method of choice over many older conventional modalities. There is ample proof to support the statement that Ultrasonics is superior to some of the older methods of approach in at least these conditions.

One of the things that Ultrasonics does is RELIEVE PAIN in a number of the hard-to-treat conditions which the physician sees regularly. Among these are sub-deltoid "bursitis", the "rheumatics", "neuritis" and so-called low-grade back distress. In some instances the relief is dramatic.

Is that just another advertising statement? It is not, nor is it gleaned from the writings of European fanatics unknown to the medical profession. It is a proven fact based upon the published reports of some of the most reputable workers in the American field of therapeutics.

John H. Aldes, M.D., F.A.C.S., Department of Physical Medicine and Rehabilitation, Cedars of Lebanon Hospital, Los Angeles, and an orthopedic surgeon in speaking of sub-deltoid "bursitis", both chronic and acute, states:

> "I want to tell you that I have performed only two operations by the Abbott technic in the past two and one-half years, and those only because I wanted to find out what type of calcareous deposit was in the bursa. As far as I am concerned, the method of choice at the present time will be Ultrasound, until I have proved otherwise after continuation of X-Ray studies and evaluation of these patients". (American Journal of Physical Medicine, February, 1954)

Dr. Aldes' statement is not based on supposition. It is a simple statement of fact based on experience with 187 cases.

H. J. Behrend, M.D. and Jerome Weiss, M.D., New York City, make a significant statement concerning the diseases predominant in old age among which they enumerate the so-called "rheumatic" diseases, neurologic disorders, trauma and traumatic complications of other diseases:

> "Ultrasonic therapy applied locally and to the segmental roots has given results which in many instances are superior to those obtainable by other means at our disposal. The criteria of improvement of our cases are relief of pain and paresthesia, increased range of joint motion and lessening of swelling, atrophy and contracture. . .We feel that our clinical experience based on 6,000 treatments given over a period of three and one-half years is consistent with the following conclusions. Ultrasonic therapy is a valuable form of treatment which is not dangerous within the therapeutic limits of accepted dosage in competent hands. Further investigation along the lines we have indicated will undoubtedly establish firmly the value of Ultrasonic therapy in geriatrics". (American Journal of Physical Medicine, February, 1954)

The statement of Drs. Behrend and Weiss is not based on supposition. It is a simple statement of fact based on experience involving some 6,000 treatments.

Arthur C. Jones, M.D., Portland, Oregon, in discussing the broad category of diseases termed "neuritis", says:

> "Neuritis is a term which has almost ceased to have a specific meaning. Probably, a majority of cases which used to be classed as brachial or sciatic neuritis were actually radiculitis. . . The observed fact is that patients do experience analgesia with relatively tiny doses of Ultrasound energy over irritated nerves, or their roots, when properly directed. Patients with sciatic neuritis following compression, respiratory infections or reaction from antibiotics or drugs have reported rapid and permanent relief of pain when Ultrasound was added to the usual mild radiant heat, analgesic medication and vitamin B therapy". (American Journal of Physical Medicine, February, 1954)

Dr. Jones' statement is not based on supposition. It is a simple statement of fact based on some two years clinical work.

Such reports could go on almost indefinitely because the literature merely emphasizes similar experiences of others. Probably, the best summation of the present status of Ultrasonics is found in the conclusions of Aldes and his co-workers:

> "In our opinion Ultrasound is not a substitute but rather an addition to the other modalities employed. A combination of Ultrasonic radiation with other conservative measures has proved especially effective when patients failed to benefit from conventional treatment or Ultrasonic therapy alone".

So, here are three of the hard-to-treat conditions with which every Physician has to contend and in which pain is the predominant characteristic. To those who have suffered the excruciating agony of acute bursitis, sciatic or brachial "neuritis" and the like or the exhausting persistence of chronic bursitis

and the "rheumatics", such involvements are the epitome of pain. So, they call upon their doctors for relief as rapidly as possible.

Pertaining to these very conditions review the import of some of the statements in the previous reports:

> "Results which in many instances are superior to those obtainable by other means at our disposal" . . . "Relief of pain and paresthesia, increased range of joint motion and lessening of swelling" . . . "Rapid and permanent relief of pain" . . . "Especially effective when patients failed to benefit from conventional treatment" . . . "The method of choice at the present time will be Ultrasound" . . .

Warts can be fulgurated. Boils can be lanced. It is a matter of record that some very effective drugs are combating tuberculosis. Stomach ulcers are controlled by dietetic and medicinal measures. So why prattle about Ultrasonics for conditions in which conventional methods have proven their dependability? Why not, instead, strongly urge its use in those several indications where, as set forth in the above references, it is known to be highly efficacious?

Another important factor in the consideration of Ultrasonics is conservation of time. An effective treatment with Diathermy demands a minimum of 20 minutes and 30 minutes is better. In fact, few if any Physical Medicine modalities can be administered effectively in less than ten to thirty minutes. With Ultrasonics all authorities on the subject agree that <u>three</u> to <u>six</u> minutes is ample for treatment of any single area.

In substance then, here is a new method of treatment which has proven itself in the hands of qualified authorities as being particularly effective for these difficult cases. The dramatically spectacular results obtained in some of the less complicated conditions are merely an added bonus.

This is the status of Ultrasonics today!

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The Model No. 6 is manufactured in Franklin Park, Ill., (a Chicago Suburb) by highly skilled craftsmen, of the finest materials, and precision engineered for efficient performance and great durability.

ELECTRONIC GENERATOR

The Electronic Generator in the H. G. Fischer & Co. Model No. 6 Ultrasonic Generator is a high-frequency oscillator of the highest quality. The electronic impulses it generates and impresses upon the quartz crystals are tuned to match precisely the mechanical vibration frequency of the quartz crystal. The entire unit is completely shielded and is equipped with a specially constructed line filter that reduces feed-back of high frequency on the supply line to the very minimum. H. G. Fischer & Co. Model No. 6 Ultrasonic Generator has the Federal Communications Commission Type Approval No. U-106 and the Underwriters' Laboratories Approval.

Each Electronic Generator is individually calibrated with a Siemens Sonatest—a high-precision calibration device that is the accepted method of calibration by the Food and Drug Administration.

TRANSDUCER

The H. G. Fischer & Co. Ultrasonic Transducer is composed of a quartz crystal cemented securely in the head, and an electronic contactor held firmly against the crystal by a strong spring tension. The crystal has an area of 10 square centimeters. A rubber grip prevents the transmission of vibrations into the operator's hand. The entire Transducer weighs but 12 ounces; and the flexible coaxial cable from the Electronic Generator to the Transducer weighs only 4 ounces.

The quartz crystal used in the H. G. Fischer & Co. Ultrasonic Unit is cut from the mother crystal along predetermined lines of activity and is precisely ground by specialists to a specified dimension which determines the frequency at which it will vibrate—one million cycles per second. The **frequency** of the oscillations remains constant throughout the power range of the unit. The **intensity** of the vibrations can be varied, however, by applying more or less electronic power to the crystal.

Fabrication of the Transducer is as precise and critical as that required in the preparation of the quartz crystal. The end plate, to which the quartz crystal is cemented, is made to possess exactly the same properties of oscillation as the quartz crystal to prevent it from absorbing the mechanical motion and reducing the total output. Furthermore, the Transducer is hermetically sealed to prevent the seepage of water when used in any of the under-water technics.

The flexible coaxial cable connecting the Electronic Generator to the Transducer is shielded with Polyethylene, a vastly superior insulation specified by the Armed Forces for insulation on all battlefield communication wire and cable. The cable is of ample length for use of the Transducer with a patient on a treatment table.

OUTPUT METER

The meter shows both the output in watts per square centimeter and the total output in watts—From 1/10 watt to 3 watts per square centimeter or 1 watt to 30 watts total output. By observing the meter it is easy to determine if the Transducer is in proper contact with tissue for effective treatment and also how much ultrasound output the patient is receiving. It is not necessary to depend upon unreliable lights or other gadgets.

CONTROL

A single, stepless control regulates the ultrasound output of the unit from 0 on the left to 3 watts per square centimeter (30 watts total) on the right. This is considerably higher than most other ultrasonic units, as shown by actual comparative tests.

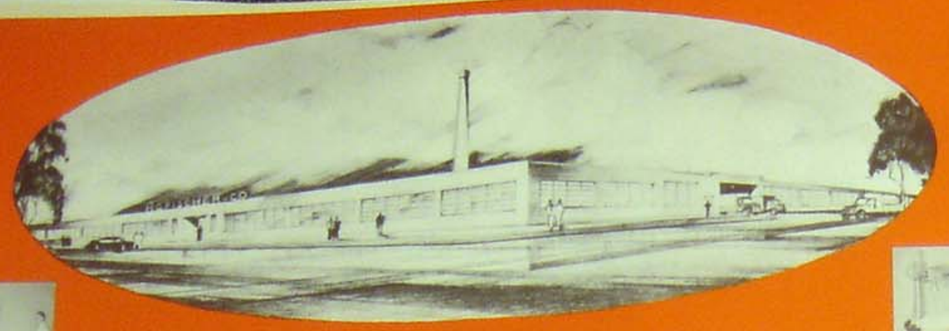
TREATMENT TIMER

The H. G. Fischer & Co. Model No. 6 Ultrasonic Unit is equipped with a combination power switch and treatment timer which turns off the current at the end of any desired treatment time from one to fifteen minutes.

CHROME-PLATED CABINET

The H. G. Fischer & Co. Model No. 6 Ultrasonic Unit is housed in a beautiful chrome-plated cabinet 16⅝" long, 10" deep, and 12¼" high. The complete unit weighs only thirty-eight pounds. A mobile utility stand is available.

Cat. No.	Code	Description
4657A	AKUAL	H.G. Fischer & Co. Model No. 6 Ultrasonic Generator
5023	TUBUL	Tubular Mobile Utility Stand



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Fischer Three Unit Volt Generator



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United States Navy

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In grateful acknowledgment of exceptional cooperation and outstanding services rendered to the Medical Department of the Navy during the period of World War II

Rear Admiral, MC, U.S.N.
Surgeon General of the Navy



A. H. Dearing, Rear Admiral, MC, U. S. Navy, presenting Certificate of Achievement to A. W. Mathis, President, H. G. Fischer & Co. (Official U. S. Navy photograph.)

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The complete H. G. FISCHER & CO. line includes many models of Modern X-ray apparatus (medical and dental), Short Wave Diathermy Units, Ultrasonic Units, Low Volt Generators, Therme-Flo, Infra Red Generators, other apparatus, supplies and accessories. H. G. FISCHER & CO. has always maintained the policy of meeting or exceeding the standards of any competing units designed for the same purpose, regardless of price, and pricing all apparatus at the lowest point consistent with quality manufacture.

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All H. G. FISCHER & CO. apparatus is serviced and sold through factory-trained representatives who are well qualified to render necessary technical assistance. Our comparatively small overhead expense and factory-trained representation enable us to give purchasers such value per dollar expended as cannot be excelled by any other manufacturer in the field.

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"Multi-Service" 200 or 100 Milliampere X-ray Apparatus, Hand-Rocked or Motor-Driven Table.



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Spacesaver Vertical Fluoroscope.



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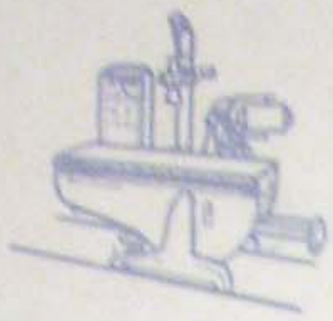
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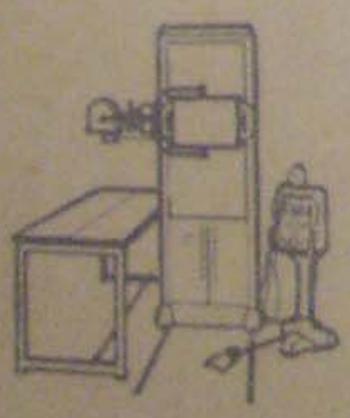
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SIMPLIFIED MANUAL

OF

X-RAY TECHNIC

FOREWORD

This manual of Medical x-ray technic and related data has been prepared by the X-ray Field Service Department of H. G. FISCHER & CO. and is presented to you with their compliments.

It is not intended to be a complete treatise on radiographic technic, but consists of an accumulation of papers or sets of papers containing general practical information on the subject.

The entire purpose of the manual is to give you, in condensed form, material of a nature that we believe will have the effect of improving radiographic end results and consequently the accuracy of a diagnosis.

Special attention has been paid to positioning and we hope that the positioning information, both written and photographic, will be of value to you.

H. G. FISCHER & CO. are vitally interested in every Fischer installation and you are cordially invited to call upon them at any time for helpful technical suggestions.

H. G. FISCHER & CO.

RECOMMENDED PROCEDURE FOR ADJUSTING AND SETTING UP EQUIPMENT FOR RADIOGRAPHIC WORK

Experience has proven that if a routine procedure is followed when making a radiograph, many mistakes and omissions will be eliminated with the resulting economy in film.

While experienced operators will have their own ideas of radiographic procedure, it is recommended that operators with little or no experience follow the step by step routine outlined below.

1. After determining what anatomical part is to be radiographed, refer to the technic chart furnished, which shows all the technical factors that will be used, such as milliamperes, kilovoltage, distance and time. The chart will also show if the Bucky diaphram is to be used. All factors that can be preset should be adjusted before the patient is placed on the table.

2. If high milliampere values are to be used (50 MA or more) the tube should be prewarmed. Prewarming of the tube before using high milliampere values will increase tube life. A machine setting of 5 milliamperes, 85 kilovolts, and 10 second time is sufficient to prewarm the x-ray tube. If the x-ray tube has been used within the past two hours, prewarming of the x-ray tube is not necessary.

3. If the machine has an automatic control, place milliampere selector switch on milliampere value shown on technic chart. If the control is of the manual type, set milliamperes by means of the main and auxiliary filament controls.

4. If control has a line compensator, adjust line compensator switch so that line compensator meter reads on red line.

5. If bucky is to be used, place timer switch in bucky timer position. If bucky is not used, place timer switch in timer position. Adjust timer for time factor shown on chart.

6. If bucky is used set timing device on Bucky diaphragm for approximately 20% more time than the actual time of exposure. Cock bucky by pulling Cocking handle all the way out.

7. If Bucky is used, make certain that the x-ray tube is centered on the table.

8. Adjust x-ray tube for correct height as indicated on the chart.

9. Place patient on the x-ray table making certain that the patient is centered on the table.

10. Measure patient with centimeter thickness caliper and set kilovoltage according to the chart.

11. Place cassette in bucky tray and position bucky so that part to be radiographed is centered on the cassette.

12. Center x-ray tube on cassette in Bucky diaphragm.

13. If compression band is to be used, place compression band in place and tighten lightly.

14. Double check all procedure such as line compensator, milliampere selector, kilovoltage, timer and timer switch, bucky timing, bucky cocking and height.

15. Tighten compression band if used.

16. Press timer push button. If Bucky diaphragm is used, it is only necessary to depress timer button for about 1/4 second. If bucky is not used and timer switch is set in timer position, it is necessary to hold timer push button down until timer automatically cuts off.

SPECIAL NOTES

1. Always prewarm cold tube when using high MA values.

2. On manual controls when using high MA values, always test milliampere setting at a kilovoltage 20 KV below the voltage value being used.

3. Longer tube life will follow if machine is turned off while positioning patient or changing patients.

4. Always use as small a cone as possible and still cover anatomical area to be radiographed.

5. Grasp compression band with hand and release slowly to eliminate injury to patient by the sudden release of the pressure.

6. Always keep loaded cassette in protective film chest until ready to make radiograph.

7. If red position of heat indicator shows on tube, further use must stop until tube cools off and heat indicator goes down.

8. Testing of MA values on manual controls should be done as rapidly as possible as time consumed in testing is the same as in actual exposure.

9. Consult tube loading chart for safe operation of tube.

FLUROSCOPY

The Following Fluoroscopic Precautions and Procedures Shall Be Observed.

The operator shall allow his eyes to become fully accommodated to the darkness before starting a fluoroscopic examination. This may be done by remaining in a dark room or wearing fluoroscopic goggles provided with special colored lenses. At least five to ten minutes are necessary for proper accommodation of the eyes.

Failure to observe this rule will result in unsatisfactory fluoroscopic vision and will tempt the operator to increase the milliamperage and kilovoltage, beyond the recommended maximum value thus exposing the patient, and under certain conditions himself, to dangerous amounts of radiation.

This rule applies with particular emphasis to the use of head or hand type fluoroscopes.

X-Ray protection devices such as lead rubber gloves, lead rubber aprons, lead protected fluoroscopic chair, etc. shall always be used. The operator's bare hands shall never be exposed to the x-ray beam.

The distance between the target of the x-ray tube and the patient's skin shall be at least ten (10) inches. Greater distances are preferable since they reduce the likelihood of overexposure and improve the fluoroscopic image. The intensity of the x-radiation reaching the patient's skin varies as the square of the distance from the target of the x-ray tube. For example the intensity at ten (10) inch distance is four times that at twenty (20) inches, all other factors remaining the same.

The best practice is to use a minimum of one millimeter aluminum filter or its equivalent between the x-ray tube and the patient, to eliminate long wave length radiation which is injurious to the skin.

The milliamperage setting shall be as low as possible without sacrificing satisfactory fluoroscopic vision. Milliamperage shall in no case exceed five (5) milliamperes.

Kilovoltage is set in accordance with the thickness and density of the body part being examined. For best vision it shall be kept as low as possible and although 100 KV is available in some installations, it is a rare instance that requires more than 85 KV. It is common practice to use not more than five (5) milliamperes at 85 KV for abdominal fluoroscopy. Five (5) milliamperes at 75 to 85 KV for chest, five (5) milliamperes at 60 KV for extremities.

Make short intermittent exposures rather than continued ones. This practice allows the eyes to re-accommodate during the dark intervals and increases the visibility of the image. It reduces the amount of radiation the patient receives and prolongs the life of the x-ray tube.

Restrict the size of the radiation aperture or shutter to the smallest area necessary to cover the part being examined. This prevents needless exposure of other parts of the patient's body and improves the sharpness of the fluoroscopic image.

Consult the tube rating chart for maximum permissible time, kilovoltage and milliamperage which apply to your fluoroscopic tube. Never exceed these ratings.

As a guide in determining the safe exposure factors consult the enclosed table of maximum permissible exposure value in milliampere seconds. Milliampere seconds are the product of milliamperes and total actual exposure time in seconds. In using this table the maximum permissible exposure time in seconds is obtained by dividing the milliamperes used into the value of milliampere seconds permissible, for example, if the milliampere seconds used are five and the permissible exposure value in milliampere seconds total 1000 at a given filtration and distance, the milliamperage five (5) is divided into the milliamperage seconds 1000 which gives the time 200 seconds. This figure constitutes the maximum exposure time permissible.

MAXIMUM EXPOSURE FACTORS PERMISSIBLE FOR ALL PARTS OF THE BODY EXCEPT HEAD WHEN USING 85 KILOVOLTS PEAK

FACTORS APPLY TO BOTH RADIOGRAPHY AND FLUOROSCOPY

Anode Skin Distance Inches	Aluminum filter .5 MM inherent .5 MM external Permissible Milliampere second Exposure
10"	510 MAS
12"	730 MAS
14"	1000 MAS
16"	1300 MAS
18"	1650 MAS
20"	2050 MAS
22"	2450 MAS
24"	2900 MAS
30"	4500 MAS
36"	6500 MAS
42"	8850 MAS
48"	11600 MAS
60"	18000 MAS
72"	26000 MAS

CAUTION When radiographing the head, reduce above milliampere second factors 30%.

VARIATION IN MAXIMUM PERMISSIBLE EXPOSURE VALUES WITH CHANGE IN KILOVOLTAGE

Kilovolts	Change in permissible exposure values
100 KVP	Reduce by 25%
90 KVP	Reduce by 8%
85 KVP	No change
80 KVP	Increase by 10%
70 KVP	Increase by 35%
60 KVP	Increase by 80%

NOTE Milliampere seconds - Milliamperes X Time in seconds.

Example:
100 Milliamperes 1 second = 100 MAS
50 Milliamperes 2 seconds= 100 MAS
25 Milliamperes 4 seconds= 100 MAS
10 Milliamperes 10 seconds= 100 MAS
5 Milliamperes 20 seconds= 100 MAS

GENERAL DARK ROOM INFORMATION

Too much stress cannot be laid on the importance of the processing room construction and technical procedures, whether it be for private practice or a large institution. It is to be realized that the quality of the end result depends entirely on the facilities and the procedure used.

No radiograph is complete until it has passed through the developing process. Experience proves that even with the best radiographic equipment and accessories, radiographic technic can be made mediocre by faulty processing room service. Yet it is doubtful if ten percent of film processing laboratories the world over are on a par with the rest of the x-ray department in point of facilities to handle the work. Most laboratories are handicapped because the equipment in the processing room and the haphazard procedures used are inadequate.

LOCATION OF PROCESSING ROOM

An important consideration when planning a dark room is its location. First it must be within a reasonable distance from the x-ray machine. Second, it must be convenient to plumbing and electrical connections. Another important factor is ventilation.

CONSTRUCTION OF PROCESSING ROOM

Construction of processing room with reference to materials used is limited. It must be of such material as to preclude leakage of ordinary light and x-ray if unexposed films are to be stored in the dark room. The size of the dark room is determined by the nature and average amount of work that is to be handled. The minimum dimension should still allow room for convenient and efficient processing procedures. If considerable work is to be handled mazes are generally used which permits entering and leaving the dark room without the necessity of opening and closing doors.

COLOR TREATMENTS OF WALLS

In respect to the color treatment of the walls of the processing room, it is apparent there is much misunderstanding. Most x-ray laboratories utilize either black or some other dark pigment which is not necessary. The problem of color selection for the dark room is not important if the dark room is light proof. If a maze is used in conjunction with the dark room, the maze should be painted a dull dark color so that daylight or white light will be absorbed before it enters the dark room.

In many cases an acid and alkali proof paint is used around the developing tank. This should be a paint which is uneffected by acid or alkali and can be readily washed.

ACCESSORY EQUIPMENT

The following equipment is necessary in the dark room.

1. Safe lights.
2. Storage shelves or cabinets.
3. Loading bench.
4. Racks for developing hangers.
5. Developing tank.
6. Water temperature control, either manual or automatic.

7. Thermometer. Be sure to use a thermometer that is designed for developing purposes and which is accurate around 70 degrees Fahrenheit.
8. Developing timer.
9. Drying equipment, either film dryers or racks to hold the films while they are drying.
10. In large installations, a pass box between the radiographic room and the dark room.

ILLUMINATION

Safe lights cause a large percentage of processing room trouble. Fogging of the x-ray film is a phenomenon which the average operator may find difficult to trace to its source, that is to determine whether it is caused by the safelight, x-ray, or a chemical reaction. It is well to remember that there is no such thing as a safe light in the strict sense of the word. All safelights will fog sensitize emulsions by excessive exposure. Thus the problem of film exposure to light is an important one.

In the final analysis, the maximum amount of light intensity or wattage that may be used in the safelight is determined by the following four factors:

1. Location of safelight. That is, safelight to film distance.
2. Safelight filtration or the quality of light allowed to pass through the light filter.
3. Speed of placing the film in hanger.
4. Speed of operation while observing stage of development and rinsing film and placing it in the fixer or hypo solution.

It is apparent from the foregoing, the intensity or wattage of the bulbs used in dark room safelights is dependent upon the speed of the operator when processing a film.

STORAGE FACILITIES

Storage shelves should be of such size as to allow the housing of all sizes of films, cassettes and supplies. If a storage cabinet is used where the covers of the film box are removed, the storage cabinet should be equipped with limit or safety switches which will automatically put out all lights in the dark room with the exception of the safelights, should the storage chest or box be opened accidentally when the white lights are on.

LOADING FACILITIES

The loading bench should be of size which would allow the opening of film packages and loading of cassettes conveniently. The loading bench should always be kept clean as any form of contamination may not only ruin the film to a point where diagnosis is impossible, but also damage the intensifying screen. The loading bench should be situated away from the developing tank so that the developer and hypo will not be accidently spilled on the screens.

FILM HANGERS

Film hangers are an important item in the processing room procedure. They should be stored in a convenient location where they can be readily reached for loading of films for developing. They must be kept clean and should be thoroughly washed. This can be accomplished while washing the film provided the water in the washing tank covers the cross bar on the hanger. The flexible arms at the top of the developing frame should be adjusted so that the film is held taut in the

frame, thus eliminating a possibility of the film touching an adjacent film or the side of the tank which will cause an undeveloped area.

TANKS

Tanks for developing, rinsing and fixing should be of a size and capacity to meet the requirements of the individual laboratory. It should be capable of maintaining temperetures and be durable with a minimum reaction to chemicals. Many tank combinations are available the sizes and combinations depending entirely upon the amount of work to be done.

WATER TEMPERATURE CONTROL

Inasmuch as the temperature of the developing and fixing solutions are controlled by the rinse and washing water in the water compartment, it is necessary that some control be available for controlling the temperature of the water. In some installations it is merely necessary to have a hot and cold water valve which will permit adjusting the temperature of the water to the correct value. Other installations use thermostatic mixing valves whereby the temperature of the water is automatically controlled. In hot humid climates, very often it is necessary to use a refrigerated tank.

THERMOMETER

The dark room thermometer should be large enough so that its calibration can be read with accuracy when only the dark room lights are on. The dark room thermometer should not be housed in wood for this not only causes error in readings but also causes it to absorb chemicals. Over a period of time this will cause contamination of the solution. To avoid scratches the thermometer should not be allowed to come in contact with the films.

TIMER

A reliable timer is an indispensable item for accurate timing the intervals required in film processing. It should be sturdy and accurate and with a range sufficient to allow the maximum developing time and with a means of signaling when the interval is concluded.

DRYING EQUIPMENT

There are many forms of drying equipment and the type selected will of course depend on the amount of work that the laboratory is doing. Dryers can be obtained which are just ordinary racks where the film is allowed to drain and dry naturally. Other film dryers use forced draft and in some cases heat in order to dry the films quickly. Film dryers are available which not only can be used as film dryers but also as loading benches.

PASS BOX

In large laboratories the use of a pass box between the dark room and the radiographic room is a great convenience. Pass boxes are so designed that if the door on the radiographic room is open the door on the dark room side cannot be opened. This eliminates the possibility of white light entering the darkroom accidentally.

LOADING OF FILMS

When removing a film for loading in a cardboard holder the black paper which encloses the film should not be removed but placed with the film in the holder, this minimizes the possibility of fogging the film. When loading a cassette, however, the operator must be sure to let the paper fall away from the film. This is accomplished by taking the film out with the right hand, separating the film from the paper with the left hand and then allowing the paper to fall away from the film, thus minimizing friction and static. If there is difficulty in replacing the cover on the film carton, the sides should be pressed inward. This releases the air and allows the cover to fall into place.

DEVELOPING AND FIXING

The developing and fixing solution unless used at par strength and according to prescribed time and temperature are possible causes of more dark room trouble than any other factors. Temperature is very important in developing an x-ray film. As the temperature is raised the alkali works faster and as the temperature lowers it is retarded. The operator should consult the recommended developing time which will be found on the label of the developing container. It is also recommended that the developer manufactured by the film manufacturer be used.

Many operators make the mistake of trying to stretch out the life of their developer. This usually will cause a poor grade of radiograph with a decided falling off of the diagnostic qualities, and in the end it is poor economy as films are bound to be ruined and inasmuch as the developer is much cheaper than films it is advantageous to discard the developer before it reaches the point where it will affect the quality of the film.

THE FIXING PROCESS

A hypo solution which is used for fixing must do two things to the emulsion of the film. First, it must stop development and must free the emulsion from all unexposed or unreduced silver salts. Second, it must preserve or tan the emulsion to prevent deterioration. The greater percentage of an emulsion is gelatin and being animal matter it will decompose and deteriorate if not properly treated. The question of how long a film should be fixed is often brought up. A safe rule is to fix twice as long as it takes for the unreduced silver (seen as a yellow creamy substance) to disappear from the film.

LIFE OF DEVELOPING SOLUTION

The developing solution may become exhausted from age rather than from use. However, it is simple to determine the efficiency of the solution by checking the quality of the radiograph developed in it. The first sign of age in a developing solution is discoloration. It will gradually turn yellow and continue to turn dark brown. Developer in such a condition may produce stains and fog and obliterate the contrast that might be otherwise on the film.

LIFE OF THE FIXING SOLUTION

Hypo does not deteriorate rapidly unless films are processed through it. The length of time required to completely fix a film is a reliable check on the strength of the hypo. If it requires more than four times as long to fix a film as when the hypo is new and at the same temperature, it should be replaced.

PREPARATION OF SOLUTION

When mixing new solutions, it is important that the tanks be thoroughly scrubbed. If this is not done, some of the old chemicals will be mixed in with the fresh and the process of oxidation will be set up at once and shorten the life of the new chemicals.

QUESTIONS AND ANSWERS ON DARK ROOM TECHNIC

Question: What is the most important factor in designing a dark room?
Answer: The dark room must be what the name implies. Absolutely dark. Even a small pinhole of light will effect the film.

Question: Should the dark room walls be painted black?
Answer: If the room is light proof, the color makes no difference. Black walls are less apt to reflect light that leaks in around doors, etc.

Question: Can a window in the dark room be painted black to keep out the daylight?
Answer: Paint as a rule is unsatisfactory as it develops pinholes. It is much better to cover the window with some light opaque material.

Question: What is the most common cause of fogging films?
Answer: Faulty dark room lights. All dark room lights will fog the film if exposed to the light long enough. However, a good dark room light will not fog the film in the ordinary time required to process the film.

Question: Is the wattage of the bulb used in the dark room light important?
Answer: Very important. Never use a larger lamp bulb than that recommended by the manufacturer. (Usually 15 watts)

Question: How can the dark room light be tested?
Answer: Take a fresh film without any x-ray exposure on it and cover half of the film with the black paper it is wrapped in. Place the film about three feet from the dark room light and expose it for three minutes. Develop in the regular way and at the correct time for the temperature of the developer. If the light is fogging, the half of the film which was not covered will show fog.

Question: What kind of developer should be used?
Answer: It is recommended that developer made by the company making the film be used.

Question: Should regular or rapid developer be used?
Answer: Either regular or rapid developer can be used. However, if rapid developer is used, the speed of the developer can be maintained by the addition of replenisher.

Question: How often should developer be changed?
Answer: That depends upon how many films are developed and how large the tank is. Developer will exhaust itself without any use in about two or three months. Developer should be changed at least every sixty days.

Question: Should films be developed by sight or time?
Answer: If the exposure technic is correct, time development is more satisfactory.

Question: How long should a correctly exposed film be developed?
Answer: That depends upon the temperature. The warmer the developer, the shorter the developing time. Follow the timing directions on the container.

Question: Should the film be completely drained of developer when removing the film from the developing tank?
Answer: No. The film should be drained for about three seconds. Further draining only drains back into the tank exhausted developer which has been in close contact with the film. Operators should figure on using 1 oz. of developer for each 8 x 10 film, 3-1/2 oz. for each 14 x 17 film, and 7 oz. for each 14 x 36 film.

Question: How long should the film be washed after removing film from the developer?
Answer: About five or six seconds. The film will keep on developing until it is put into the fixer.

Question: How long should the film be left in the fixing solution?
Answer: The time is not critical and depends upon the age of the fixer. The film should remain in the fixer at least twice as long as it takes for all the milky appearance of the film to disappear. In warm climates, the film is left in the fixer about 1/2 hour to harden the emulsion.

Question: How long should the film be washed after removing it from the fixer?
Answer: At least 15 minutes in running water.

Question: What precautions should be taken in handling the film?
Answer: Hands should be dry and care must be taken not to rub or bend the film. Rubbing the film will put abrasion marks on the film, bending the film will desensitize the film and leave streaks or moon shaped areas.

Question: What are static marks?
Answer: Black marks on the film which resemble streaks of lightning caused by friction which generates static electricity. This is more prevalent in cold frosty weather.

Question: How can static marks be minimized?
Answer: Careful handling of the film to eliminate friction. A strip of metal molding on the front edge of the loading bench which in turn is grounded to a water pipe will sometimes carry off the static charge when the cassette touches the molding.

Question: What causes stains on the film?
Answer: Old worn out solutions or insufficient washing.

Question: What causes small round white spots on the film?
Answer: Air bubbles. This can be eliminated by raising and lowering the film several times when first put into the developer.

Question: Should the film be agitated while developing?
Answer: Yes. The film should be raised and lowered in the developer about every thirty seconds. This will bring in fresh developer to replace the exhausted developer which has been in contact with the film.

Question: Must films be protected from x-ray exposure while in the dark room?
Answer: Yes. Films or loaded cassettes should be stored in a metal protective chest. On some installations a sheet of 1/16 inch sheet lead is fastened to the wall between the film and the source of x-ray radiation. The films must be stored behind the lead when the x-ray equipment is in operation.

Question: Will it be detrimental if developer gets into the fixer or fixer into the developer?
Answer: Developer in the fixer is not detrimental unless the amount is excessive. However, it only takes a few drops of fixing solution to ruin the developer.

CONCLUSION

Ordinary care and attention to the many small details will improve your radiographic result and make diagnosis much easier.

TROUBLE CHART
DARK ROOM

CONDITION	CAUSE
Gray Films	1. Under developed. 2. Old developer. 3. Developer weakened by dilution. 4. Safe light fog. 5. Developer too cold. 6. Developer too hot.
Stains	1. Improper rinsing. 2. Improper washing. 3. Developer exhausted. 4. Developer contaminated. 5. Exhausted hypo.
Streaks	1. Developer not mixed completely. 2. Under developed. 3. Dirty hanger clips.
Static Marks	1. Rough handling of underloped films or cassettes. Friction.
Crescent Marks	1. Bending film while loading.
Frost like Appearance	1. Incomplete washing.
Corner Marks	1. Wet or dirty fingers. 2. Dirty hanger clips.
Blank or opaque areas	1. Films sticking together or to the side of the tank.
Light Spots	1. Fixer or water on film before development.
Dark Spots	1. Dust, liquid or powdered developer on film before development.
White Spots	1. Bubbles clinging to emulsion surface during development. 2. Dry hypo on wet film while drying.
Lack of Contrast	1. Under developed. 2. Cold developer. 3. Exhausted developer.
Multiple White Specks	1. Dirty Screens. 2. Barium on cassettes, sheets or table top.

IMPROVING THE RADIOGRAPH

Question: How can I improve detail or sharpness of the radiographic image?
Answer: Do everything possible to stop motion. Compression bands as a rule are not desirable as they cause distortion of the spine. However, a head clamp will eliminate a great deal of motion without distorting the spine. Another factor that will improve detail is to increase the focal distance. This calls for an increase in the time factor. Refer to the change of distance table on all Fischer charts to determine how much time increase is required for any desired distance. The figures shown on the change of distance table are multiplying factors and should be used to multiply the time factor shown at the standard distance. (For example) If the regular technic on a pelvis calls for 25 MA, 5 seconds at 30 inches and it is desired to increase the distance to 36 inches to improve detail, find 30 inches in the left hand column of the change of distance table then read straight across to the 36 inch vertical column. Where the 30 inch horizontal line intersects the 36 inch vertical column will be found the figures 1.4. This is the multiplying factor required to obtain the same density at 36 inches that was obtained at 30 inches. Multiplying the time factor of 5 seconds for 30 inches by 1.4 gives us a time factor of 7 seconds for 36 inches. This added time will compensate for the increased distance and produce better detail than that obtained at 30 inches. Care must be taken to make sure that the increased time will not cause motion on the part of the patient.

Question: How can radiographic contrast be improved?
Answer: By contrast we mean the percentage difference between the blacks and whites on the film.
There are many factors that effect contrast. Unsafe dark room lights, light fog, x-ray fog, outdated film, worn out solutions, etc. (See questions and answers on dark room technic). Another factor that effects contrast is secondary radiation. Secondary radiation is created in the tissues and gives the appearance of a fog. The thicker the mass and the denser the mass being x-rayed, the greater the amount of secondary radiation generated. Secondary radiation can be reduced by using a cone that just covers the area that the operator wishes to show on the film. It is obvious that reducing the size of the port of entry by the use of a cone, that secondary radiation will not be generated in tissues surrounding the anatomical area under examination.
Another factor which effects secondary radiation is kilovoltage. The higher the voltage the more secondary radiation generated in the tissues. Thick masses of tissue usually call for higher kilovoltage. If the kilovoltage is reduced and the time increased to compensate for the reduced kilovoltage, much better contrast will be obtained on heavy patients. Referring to the relation of KVP to time of exposure table on all Fischer technic charts, lets assume that we want to reduce the kilovoltage 5 KVP to improve contrast. Under the column with the heading (Reduce KVP) find the figure 5. On the same line in the next column to the left under the heading (Increase Time) will be found the figures 1-1/2. This is the multiplying factor to be used to compensate for the reduction in voltage. For example - If the chart calls for 25 MA, 5 seconds and 70 KVP and we decide to reduce the KVP 5 KVP, it will be necessary to multiply the time factor of 5 seconds by 1-1/2 which gives us 7-1/2 seconds time. If we were to reduce the KVP 10 KVP according to the table, we would have to multiply the regular time factor by 2 which

would make our exposure 10 seconds instead of 5. If for any reason it was desired to increase the KVP in order to reduce time, the two columns on the left hand side of the table can be used. It will be noted that increasing the KVP 5 KVP will reduce the time to 3/4. If we increase the KVP 10 KVP the time can be cut in half.

Question: Is it necessary to make corrections in exposure time for patients of different ages?

Answer: Yes, in some cases. No change is necessary on patients between 14 and 55 years of age. Referring to the age correction table, it will be noted that on patients over 55 years of age, the KVP should be reduced 2 KVP or the exposure reduced to 80 per cent of normal. The table also shows the reduction necessary in patients of from 1 to 12 years of age. Use of this table will permit more uniform results.

SUMMARY

Better radiographs will be obtained by:

1- Making sure there is no motion on the part of the patient.
2- Making sure all your dark room factors are correct.
3- Reducing kilovoltage and increasing distance where greater time factor is practical.

Initial Anode-Film Distance	TO CHANGE FOCAL DISTANCE FACTORS							
20"	1.0	1.6	2.3	3.2	4.0	5.8	9.0	13.0
25"	.64	1.0	1.4	2.1	2.6	3.7	5.8	8.3
30"	.44	.69	1.0	1.4	1.8	2.6	4.0	5.8
36"	.31	.48	.69	1.0	1.2	1.8	2.8	4.0
40"	.25	.39	.56	.81	1.0	1.4	2.3	3.2
48"	.17	.27	.39	.59	.69	1.0	1.6	2.3
60"	.11	.17	.25	.36	.44	.64	1.0	1.4
72"	.08	.12	.17	.25	.31	.44	.69	1.0
New Anode-Film Distance	20"	25"	30"	36"	40"	48"	60"	72"

RELATION OF KVP TO TIME OF EXPOSURE			
REDUCE TIME	ADD KVP.	INCREASE TIME	REDUCE KVP.
3/4	5	1-1/2	5
2/3	8	2	10
1/2	10	2-1/2	12
TO 3/5	12	TO 3	13
1/3	13	4	16
1/4	16	4-1/2	17
1/5	18	5	18

AGE CORRECTION		
BY EXPOSURE OR KILO-VOLTS		
PER-CENT EXPOSURE	AGE	REDUCE K.V.P.
100%	14 to 55	0 K.V.
90%	12 Years	1 K.V.
82%	10 Years	2 K.V.
72%	8 Years	3 K.V.
64%	6 Years	4 K.V.
56%	4 Years	6 K.V.
48%	2 Years	8 K.V.
44%	1 Year	9 K.V.
Over 55 Years Employ 80% or -2 K.V. less.		

For an explanation of the above tables refer to article on improving the Radiograph.

QUESTIONS AND ANSWERS ON THE USE AND CARE OF INTENSIFYING SCREENS AND CASSETTES

Question: What are intensifying screens?
Answer: Intensifying screens are made with a cardboard base and coated with a fluorescent material which emits visible light when excited by x-ray radiation.

Question: How are intensifying screens used in radiographic work?
Answer: The intensifying screens are mounted in a light proof holder called a cassette. The film is loaded in the cassette in a dark room. Both fluorescent surfaces of the screens are in direct contact with the film.

Question: Just what happens when x-radiation strikes the screens?
Answer: The screens fluoresce with visible light in direct proportion to the amount of x-ray radiation striking the screens. The result is that the film is not only exposed with x-ray but is exposed with visible light.

Question: What is the advantage of this?
Answer: It permits a much shorter exposure time.

Question: What is the intensifying factor when using intensifying screens?
Answer: The intensifying factor will vary with the kilovoltage. On an average it will be about 40 to 1.

Question: What percentage of the exposure is made with x-ray and what percentage is made with visible light when using intensifying screens?
Answer: About 98 percent of the exposure is made with visible light and 2 percent with x-ray radiation.

Question: What advantage does the shorter exposure time give?
Answer: Eliminates movement by the patient and saves wear and tear on the x-ray tube and machine.

Question: What films should be used with intensifying screens?
Answer: Regular films.

Question: Why?
Answer: Regular films are very sensitive to the blue light emitted from the intensifying screens.

Question: Can non screen films be used with intensifying screens?
Answer: Not satisfactorily because non screen films are not sensitive to visible light.

Question: Are all screens the same speed?
Answer: No. Intensifying screens come in three different speeds. Slow or definition, medium speed and extra fast.

Question: What determines the speed of a screen?
Answer: The size of the crystals used. The larger the crystals the faster the screen.

Question: Do high speed screens give as good detail as slower screens?
Answer: No. The slower the screen, the better the detail. However, high speed screens as manufactured today give very satisfactory radiographs.

Question: What determines the selection of screens?
Answer: The power of the equipment. Generally high speed screens are used on equipment up to 100 milliampere capacity. Par-speed or medium speed screens are used on 200 or 250 milliampere machines except on full spine work taken at a 60 inch focal distance in which case, high speed screens should be used.

Question: What care should be taken with screens?
Answer: Screens should be inspected every week and all dust particles cleaned out with a camel hair brush. If screens are soiled, clean with a wad of cotton soaked in non-medicated grain alcohol or carbon tetrachloride. Developer stains cannot be removed. Cassette should always be closed when not in use.

Question: If the screens turn yellow will it effect the speed of the screen?
Answer: Yes. Screens should be discarded if they show a yellow tinge.

Question: How should a film be removed from the cassette?
Answer: After releasing the spring bars, turn cassette upside down and lift bakelite side of cassette up. Film will drop out. This eliminates digging the film out with the finger nails and possibly ruining the screen.

Question: What care should be given cassettes?
Answer: Cassettes should be handled carefully. Dropping the cassette on the floor will very likely spring the cassette and impair the contact. Examine the bakelite backs from time to time and note if there is any bulging of the bakelite. If bulging is apparent the chances are that poor screen contact is present with the consequent loss of detail.

July 6, 1949

QUESTIONS AND ANSWERS ON BUCKY DIAPHRAGMS AND STATIONARY GRIDS

Question - What is the purpose of a bucky diaphragm or stationary grid?
Answer - The purpose of a bucky diaphragm or stationary grid is to filter out secondary or scattered radiation which is generated in the tissues and tends to fog the radiograph.

Question - How does the filtering process function?
Answer - Both the bucky diaphragm and stationary grid, incorporate a grid which is made up of alternate strips of lead and wood set on edge. X-radiation traveling in straight lines will go through the grid while scattered or secondary radiation will strike the lead strips and be absorbed.

Question - What is the difference between a bucky diaphragm and a stationary grid?
Answer - A bucky diaphragm is equipped with a motor mechanism which moves the grid continuously across the film while the exposure is being made. This movement eliminates the shadow of the lead strips. In the case of a stationary grid, the grid does not move so consequently the lead strips show on all films.

Question - Is there any advantage in using a stationary grid instead of a bucky diaphragm?
Answer - None except lower cost and portability for bedside work.

Question - What determines the efficiency of a bucky or stationary grid?
Answer - The filter ratio. The higher the ratio the more secondary radiation filtered out.

Question - What determines the filter ratio?
Answer - The ratio between the thickness of the grid and distance between the lead strips. If the thickness of the grid is six times the distance between the lead strips it would have a 6 to 1 ratio.

Question - What is meant by a 50 or 16 line grid?
Answer - A 50 line grid means that there are 50 lead strips to the inch. A 16 line grid has 16 lead strips to the inch.

Question - Does a 50 line grid have any advantages over a 16 line grid?
Answer - Yes. A 50 line grid can be made much thinner and still maintain the same filter ratio. The thinner grid has less absorption.

Question - How should the bucky diaphragm be timed in relation to the x-ray exposure?
Answer - The timing on the bucky should be about 20% longer than the actual x-ray exposure.

Question - Are the timing scales on a bucky accurate?
Answer - The timing scales are usually quite accurate when the room temperature is around 70°. At higher temperatures they will be fast and at lower temperatures they will run slow. This is due to a change in the viscosity of the oil used in the cushion chamber which will vary with the temperature.

Question - What causes grid lines on the film when using a bucky?
Answer - Several things can cause grid lines.

1st. Uneven travel of the grid due to air in the oil chambers, low oil, sticky bearings or binding of the grid or grid mechanism or some adjacent part.
2nd. Ratio of grid travel to actual timing too great.
3rd. Grid timing too short. Grid timing should be about 20% greater than actual x-ray exposure.
4th. Tube not centered on the bucky.
5th. Too great or too little tube to grid distance. (focal distance)

Question - Is it possible for all technical factors to be correct and the bucky functioning perfectly and still show grid lines?
Answer - Yes. On self-rectified units certain grid timing and x-ray timer combinations

will create a stroboscopic effect which will show grid lines even though all factors are perfect. The remedy is to change the timing of the bucky slightly.

Question - What is meant by focal distance on a bucky diaphragm or stationary grid?
Answer - The grids on a bucky and an aligned stationary grid are so designed that the lead strips are radial to focal spot of the x-ray tube at a specific tube to film distance.

Question - What focal distances are buckys built for?
Answer - Bucky diaphragms can be obtained in focal distances of 30 inches, 36 inches and 48 inches. Aligned stationary grids can be obtained in 30 and 36 inch focal distances.

Question - If a bucky or stationary grid is built for a certain focal distance does that mean that no other distance can be used?
Answer - No. A 30 inch bucky can be used at focal distances of from 25 inches to 40 inches. A 36 inch bucky can be used from 30 inches to 45 inches and a 48 inch bucky from 45 to 60 inches.

Question - Is there any difference in exposure time required if the focal distance is more or less than that which the bucky or grid was designed for?
Answer - Yes. A greater or shorter focal distance will increase the absorption in the grid and require a longer exposure time.

Question - Can a bucky designed for 48 inch focal distance be used at a 30 inch distance?
Answer - No. A 48 inch bucky cannot be used at less than 45 inches with satisfactory results.

Question - Are all stationary grids aligned?
Answer - No.. Stationary grids come in both aligned and paralleled types.
Question - Has the aligned grid any advantage over the parallel grid?
Answer - Yes. Due to the fact that the aligned grid is focused for a specific focal distance it is more efficient.
Question - When is the parallel grid used?
Answer - For long distance work such as chest taken at 72 inches.

STEREOSCOPIC WORK ON ALL T UNITS, MPA20 & MPA30 X-RAY UNITS

From time to time users and prospective customers of T Units, MPA20 and MPA30 Unit express the desire to make stereoscopic films. To make stereoscopic films of any anatomical region, it is necessary to make two films from different angles. The tube being shifted an equal distance each side of center to obtain the necessary angulation. The films must be changed without disturbing the patient which calls for the use of a cassette tunnel or Bucky diaphragm.

Due to the fact that the cone port on the T Units, MPA20 or MPA30 is 1-1/2" off center of the head, a 3" stereoscopic lateral shift can be obtained by manipulating the head in a fashion that will permit making two radiographs at different angles. The following sketches along with a step by step description of the head manipulation will allow the operator to make the necessary stereoscopic shift quickly and easily.

No. 1 Center head (not cone port) on center of Bucky or film tunnel. The Allen set screw holding the tube head in the yoke can be used as a centering point. Centering the head as described automatically placed the cone port 1-1/2" off center (see Fig.1). This is the position for the 1st stereoscopic film.

No. 2 After changing films without disturbing the patient, rotate tube head in the yoke 180° or so that tube port points up or away from the table. (See Fig.2)

No. 3 Rotate tube on its horizontal Axis or cross arm 180° so that cone port points down or towards the table. This automatically places cone port 1-1/2" the other side of center, making a total shift of 3". (See Fig. 3).

Fig. - 1

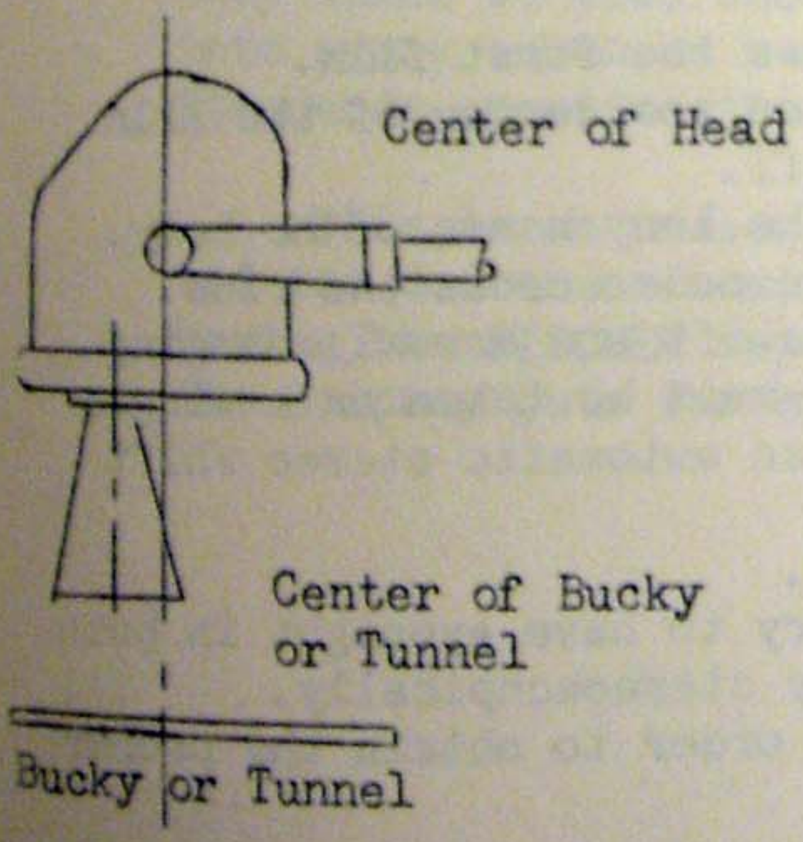


Fig. - 2

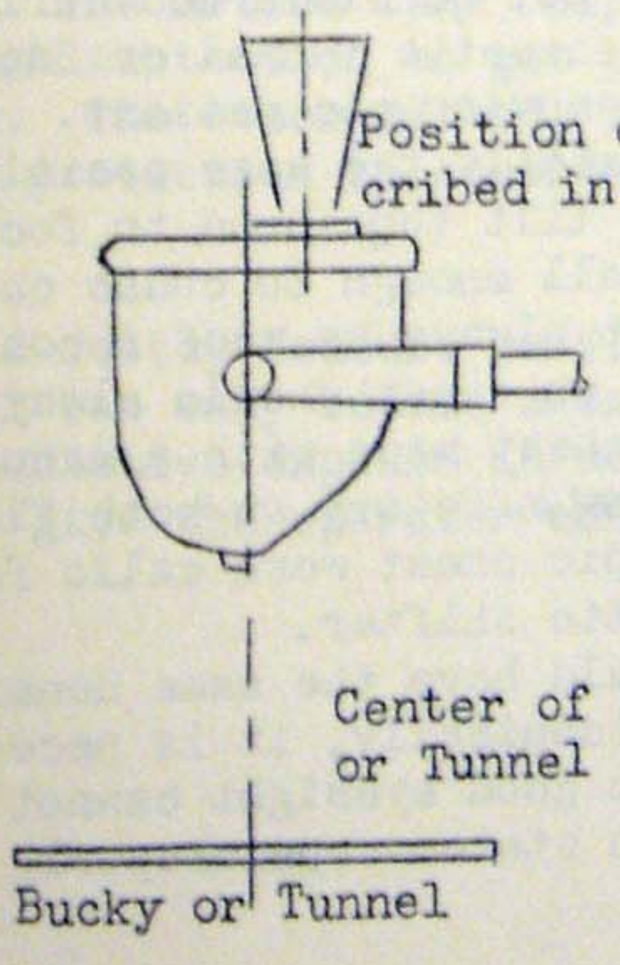
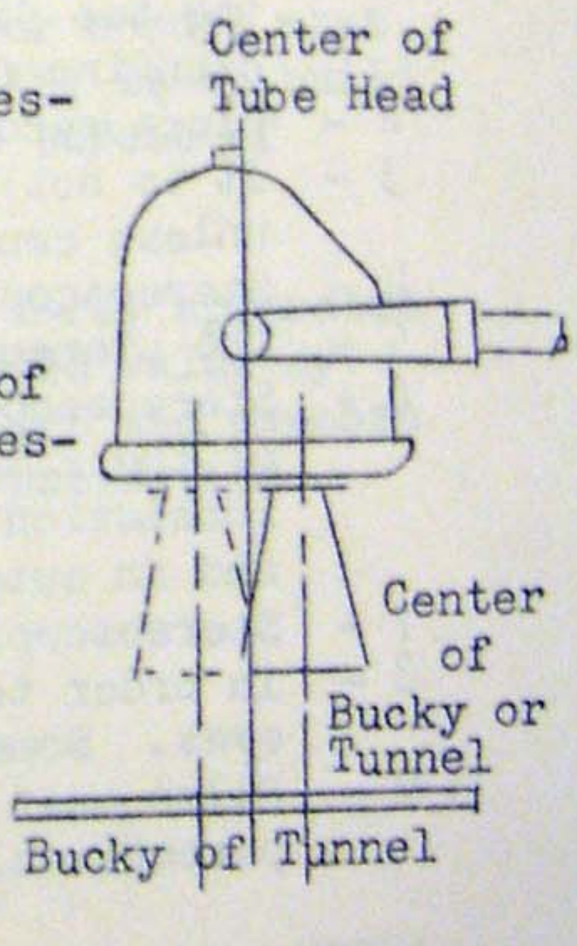


Fig. - 3

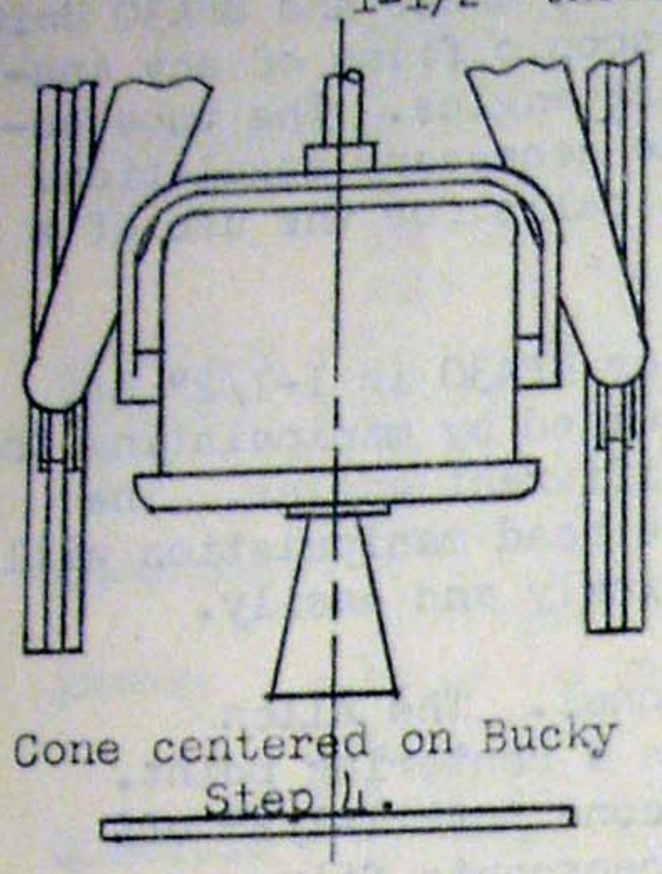


When the T Unit is mounted on rails such as is the case when using a vertical Bucky a stereoscopic shift can be made by following the step by step instructions below:

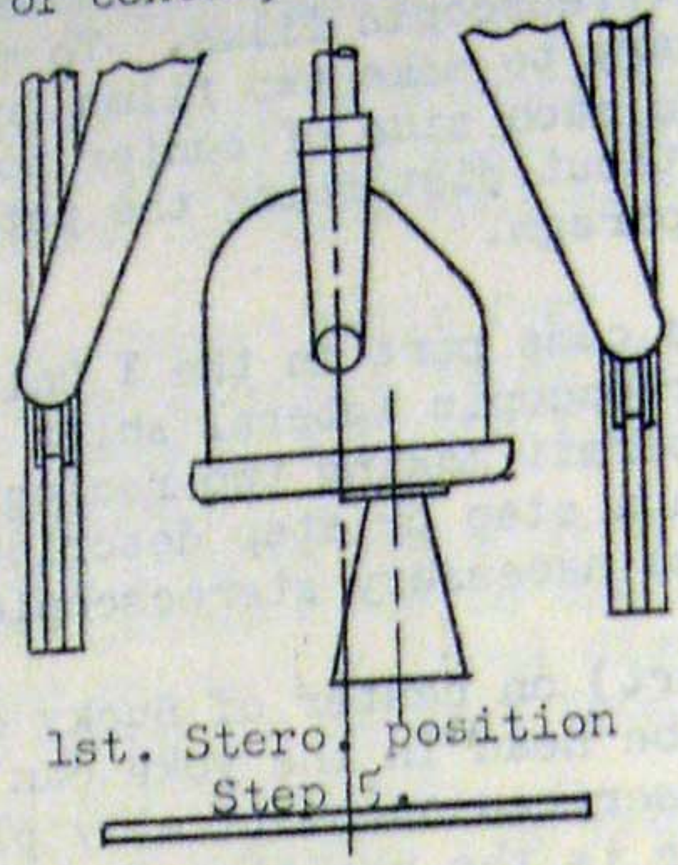
No. 1 Mount rails and Bucky so cone port centers on Bucky when head is in the position shown in Fig. 4. With the tube head in this position non-stereoscopic films can be made with the tube centered on the Bucky.

No. 2 Make 1st film by rotating tube head 90° on horizontal axis or cross arm, placing head in position shown in Fig. 5. This places cone port 1-1/2" to one side of center.

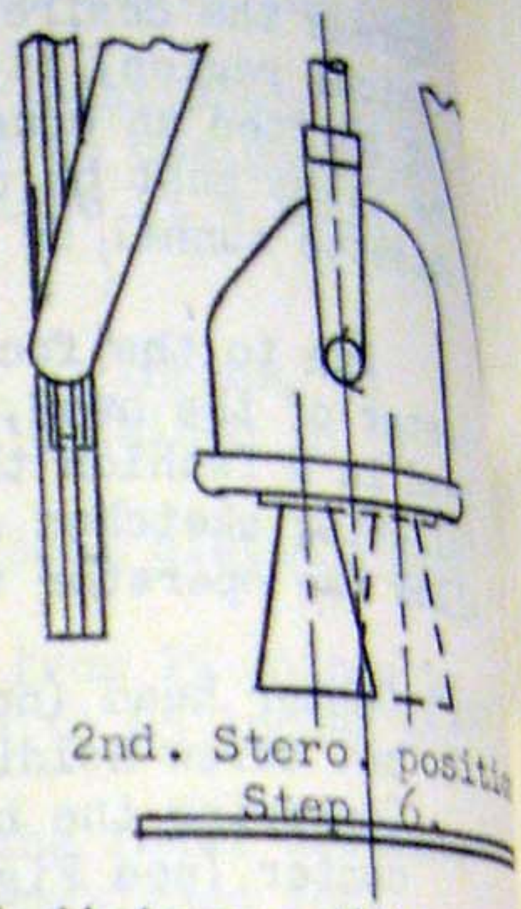
No. 3 After changing films, rotate tube head 180° on horizontal axis or cross arm placing tube head in position shown in Fig. 6. This places tube head 1-1/2" the other side of center, making a total shift of 3".



Cone centered on Bucky
Step 4.



1st. Stero. position
Step 5.



2nd. Stero. positi
Step 6.

While it is customary to shift the tube 10% of the focal distance, this shift is not critical. The 3" shift obtained on the TC,MP 10 and 20 can be used on any focal distance of from 25 to 42".

It will be found that with a little practice, a stereoscopic shift as described above can be made very quickly and with ease.

RULES FOR STEREOSCOPIC FILMS

1 - Patients position must not be disturbed during the entire process of making the two films. Use a cassette tunnel or Bucky diaphragm which will permit changing films without moving the patient.
2 - Place second film in exactly the same position as the first film.
3 - It is not necessary to tilt tube head to focus on the center of the film unless cone used is small enough to cause cut off.
4 - Stereoscopic shift must always be made across the long bones of the body.
5 - The stereoscopic shift on chest should always be made across the ribs.
6 - Stereoscopic films on chest made with a manual shift and manual changing of the films is very unsatisfactory as both films must be taken on a single inhalation. Stereoscopic chest work calls for an automatic stereo shift and an automatic cassette shifter.
7 - Stereoscopic films should have the same density.
8 - In order to see stereoscopically, it is necessary to have eyesight in both eyes. Some people with good eyesight cannot see stereoscopically.
9 - Films must be placed in stereoscope properly in order to obtain the proper perception.

NOTE:

The above method and procedure applies to any self contained head having an off set cone port.

BULLETIN

X-RAY PROTECTION AT THE TUBE HEAD

We are all aware of the dangers of x-ray radiation both to the operator and the patient. With modern day equipment, screens and films, the amount of exposure received by the patient is relatively small compared to the total amount of radiation that can be tolerated. The chief danger from the standpoint of the patient is repeated exposures or prolonged fluoroscopic examinations. However, x-ray exposure to the operator is a different story.

Due to the fact that x-ray exposure is accumulative and a tolerance is never established, such as in the case of sunburn, it is vitally essential that every precaution be taken to protect the operator who is exposed to small amounts of radiation day after day, which cannot be measured.

From the foregoing it is obvious that every effort must be made to eliminate all stray radiation from the tubehead and confine the x-ray beam so that only the radiation used in making the radiograph or fluoroscopic examination emanates from the tubehead.

All x-ray manufacturers attempt to build into their tubeheads some sort of x-ray protection. The method many competitors use, is to build into their equipment just enough protection to get by, or in other words, what they think is good enough. The other method, THE FISCHER WAY, is to build into every tubehead x-ray protection in accordance with the Bureau of Standards specifications.

This is an unseen and costly feature on FISCHER-built x-ray apparatus and the doctor or hospital can only become aware of this added value by having the FISCHER representative explain in detail the effort and expense the Company puts forth to give the operator adequate x-ray protection.

DESCRIPTION AND USE OF THE FISCHER ALIGNING CONE

In many types of x-ray work it is essential that the central ray emanating from the x-ray tube be directed accurately through certain anatomical parts in order to show the part clearly on the film without distortion or super-imposition. This is particularly true where it is necessary to angulate the x-ray tube, such as in cervical spine and sinus work.

In the past, aligning the central ray of the tube with the anatomical part has been done largely by guess work, using the eye to line up the central ray with the part. This was very inaccurate and the results very undependable.

Using the aligning cone is a very simple procedure where the machine is operated on properly placed tracks. The hole in the base of the cone in which the cord is attached should be on the operating side of the head, 90° from the perpendicular. To trace the course of the central ray from the source at the x-ray tube to the spot on the film where it will terminate, it is only necessary to line up the cord attached to the cone base with the aligning indicator on the cone proper and then stretch the cord to the spot on the bucky where the central ray will strike. Angulating the tube, adjusting the tube height and bucky height as well as angulating the patient's head is then a simple procedure. The aligning cord will also show just what anatomical structures the central ray will transverse.

In addition to the above, rotating the cone 90° so that the aligning cord and indicator are on top of the cone will permit accurate centering of the tube on the bucky in installations where mobile units not on tracks are used.

The above item is cataloged as follows:

Aligning Cone for use with any x-ray machine presently manufactured by us. Same as Cone "C" (Cat. No. 4736) except that it has aligning feature. When used with the Model TF our Cat. No. 4742 Adapter must be ordered additionally.

H. G. FISCHER & CO.

THE IMPORTANCE OF ADEQUATE POWER SUPPLY FOR X-RAY INSTALLATIONS

Occasionally we receive letters of complaint from doctors stating that their X-Ray installation is not producing the quality of radiographic work expected or desired.

There are many reasons why satisfactory results are not obtained, such as poor dark room technic, slow films, worn out screens, ect. This phase of the situation will be covered in another bulletin.

We have found that in many cases, the difficulty is due to inadequate power supply. If the line wires are too small for the load or the pole transformer is not large enough, there will be an excessive drop in voltage when the x-ray load is thrown on the line. This in turn causes a drop in KVP on the tube. The doctor might have the controls set for a given KVP (for instance) 85 KVP - 100 M.. However, due to excessive line drop he is perhaps only obtaining 75 KVP when the x-ray load is thrown on the line. This naturally causes a light film which can only be corrected by adding time or KVP.

Another factor that enters into the picture when excessive line drop is present, is that the inverse voltage increases tremendously causing added stress on cables, tube and transformer insulation. Many of the punctured cables are no doubt due to high inverse voltage caused by excessive line drop.

The attached wiring table indicates the size wire and transformer capacity required for all Fischer machines necessary to obtain satisfactory operation. The wire and transformer sizes indicated, are figured to give a line drop of not more than 3%.

NOTE: IF WIRE SIZE INDICATED IS NOT AVAILABLE, USE NEXT LARGER SIZE.

WIRING SPECIFICATIONS

TC 30 - TF 30 - DELUXE TC 30
Operating on 220V - 60 Cy

DISTANCE FEET -	50'	75'	100'	150'	200'	250'	300'	350'	400'
WIRE SIZE NO. -	12	10	10	8	8	6	6	4	4
CUT OUT BOX	- 30 AMP.								
FUSES	- 30 AMP.								
AMPERES	- 25 AMP.								

TC 30 - TF 30 - DELUXE TC 30
Operating on 110V - 60 Cy

DISTANCE FEET -	50'	75'	100'	150'	200'	250'	300'	350'	400'
WIRE SIZE NO. -	8	6	4	2	2	1	1/0	2/0	2/0
CUT OUT BOX	- 60 AMP.								
FUSES	- 60 AMP.								
AMPERES	- 50 AMP.								

TC 50 - TF 50 - DELUXE TC 50
Operating on 220V - 60 Cy ONLY

DISTANCE FEET -	50'	75'	100'	150'	200'	250'	300'	350'	400'
WIRE SIZE NO. -	10	8	8	6	4	4	2	2	2
CUT OUT BOX	- 60 AMP.								
FUSES	- 60 AMP.								
AMPERES	- 50 AMP.								

DELUXE RF-100 and RF-100
Operating on 220V - 60 Cy ONLY

DISTANCE FEET -	50'	75'	100'	150'	200'	250'	300'	350'	400'
WIRE SIZE NO. -	8	6	6	4	2	2	1	1	1/0
CUT OUT BOX	- 100 AMP.								
FUSES	- 75 AMP.								
AMPERES	- 75 AMP.								

DELUXE RF-250 Operating on 220V - 60 Cy. ONLY

DISTANCE FEET -	50'	75'	100'	150'	200'	250'	300'	350'	400'
WIRE SIZE NO. -	8	6	4	2	2	1	1/0	2/0	2/0
CUT OUT BOX	- 100 AMP.								
FUSES	- 100 AMP.								
AMPERES	- 100 AMP.								

February 23, 1950

MILLIAMPERE PRE-ADJUSTMENT SWITCH ASSEMBLY

Experience has proven that more X-Ray tubes are damaged in testing the tube for proper milliampere values than in actual radiographic exposure. This is particularly true when using high milliampere values, such as used in chest or gastrointestinal work where high milliampere values and short exposure time is necessary. In the case of a chest radiograph, the time of exposure is only 1/10 or possibly 2/10 of a second. However, if the control is adjusted to the proper milliampere value by actually passing high tension current through the tube, a minimum of 1 second is consumed in testing, as it takes that long for the milliampere meter to register the correct value. The chances are that this one-second test exposure will be made two or three times before the milliampere factor is adjusted correctly.

All time consumed in testing the X-Ray tube for correct milliamperage must be computed in the loading limit of the tube. It is easily possible for an operator to load the X-Ray tube to the limit just testing and then overload the tube when making a very short exposure, although the actual radiographic exposure is well within the load limit of the tube. So much time has been used in testing that the short radiographic exposure used is enough to exceed the heat storage limit of the X-Ray tube and tube damage results.

Fischer X-Ray apparatus, when equipped with the milliampere pre-adjustment switch, eliminates the necessity of passing high voltage through the X-Ray tube when testing the tube for correct milliampere values, thus saving wear and tear on the X-Ray tube with resulting tube economy.

To use the milliampere pre-adjustment switch, it is necessary to calibrate the unit at the time of installation. Assuming that the unit being calibrated is a 50 MA TC, which has kilovoltage scales for 10, 30, 40 and 50 MA, all four milliampere values are to be calibrated. On the blank chart furnished with all machines with preadjustment switches, (see sample below) enter in the blank squares on the milliampere line of the chart the milliampere values to be calibrated, which in the case of the TC 50 will be 10, 30, 40 and 50.

MILLIAMPERE PRE-ADJUSTMENT FOR

"T" Models 50-96

MILLIAMPERES									
PRE-ADJUSTMENT READING									

1st. Adjust the kilovoltage for approximately 50 KV.

2nd. With the timer switch on the test position, depress the timer push button and adjust the main and auxiliary milliampere controls until milliampere meter reads 10 MA.

3rd. Release timer push button and depress pre-adjustment switch located on top of control. Note meter reading on red scale which is the top scale on the meter. Record this reading on the calibration chart under 10 MA and on the pre-adjustment line.

4th. Repeat for 30, 40 and 50 milliamperes and record the readings obtained on the red scale under the proper milliampere value on the calibration chart.

NOTE: The red pre-adjustment scale on the kilovolt meter is not calibrated in milliamperes but is an arbitrary scale and bears no direct relation to the actual milliampere values. Upon calibrating the unit, it might be found that 30 milliamperes are obtained when the meter reads 22 on the pre-adjustment scale. At any future time 30 milliamperes can be obtained by depressing the pre-adjustment switch and adjusting the main and auxiliary milliampere controls until the meter reads 22 on the red pre-adjustment scale. No actual high tension current is passing through the tube.

It is obvious from the foregoing that there is a distinct advantage, when using high milliamperage, in being able to pre-adjust the milliampere values without actually passing high voltage through the tube. With the idea in mind that greater tube economy will be forthcoming if a pre-adjustment device is used, it has been decided to incorporate the pre-adjustment device in all 50 milliampere units as standard equipment.

The following x-ray units of H. G. Fischer & Co. manufacture will have incorporated in them, without extra charge, a Pre-adjustment Switch Assembly:

Cat. No.	
5137R	TCR-50 Milliampere X-ray Unit on Rails
5137R-L	Same as Cat. 5137R but with longer upright
5138	Deluxe Rail Mounted TC-50 Milliampere X-ray Unit
5136	TC-50 Milliampere Mobile X-ray Unit
5137	TC-50 Milliampere Rail Mounted X-ray Unit
5149	TF-50 Milliampere X-ray Unit
5185	Spacesaver 50 Radiographic-Fluoroscopic Unit and Examining Table

The Fischer Model RF-100 Milliampere Shockproof X-ray Apparatus with Standard Control and the Fischer Model L-200 X-ray Apparatus incorporate a Pre-adjustment Switch that differs somewhat from the Pre-adjustment arrangement on our "T" Units.

The Fischer De Luxe RF-100 Milliampere X-ray Apparatus and the Fischer De Luxe RF-25 Milliampere X-ray Apparatus do not require a Pre-adjustment arrangement since the automatic controls of these units eliminate the necessity for this device.

GENERAL INFORMATION

PATIENT COMFORT

Every effort should be made to make the patient as comfortable as possible. All equipment adjustments possible should be made before the patient is placed on the table. The longer the patient is on the table the greater the chances are for motion. When radiographing extremities, the use of sandbags will help in eliminating motion.

VARIATIONS IN TECHNIC

All technic charts are made up for average patients. Muscular patients require 20% to 30% more exposure. Soft, flabby patients require about 20% less exposure.

MEASURING THE PATIENT

The patient should always be measured in the position that the radiograph is to be taken. If the patient is to be radiographed in the horizontal position, that is the position in which the patient should be measured. If the patient is to be radiographed in the standing position, the patient should be measured in the standing position. Always make sure that the caliper just lightly touches the patient on both sides and measurement is made at the thickest part of the area to be radiographed.

AGE CORRECTION

Patients between the ages of 14 and 55 years normally have tissues of the same densities and standard technic can be employed. Patients over 55 years of age usually have a lower bone calcium and for that reason the kilovoltage should be reduced 2 kilovolts or the time reduced 20%. Patients between the ages of 1 and 14 years require less exposure, depending upon the age. By referring to the age correction table on the technic chart, the necessary correction in exposure or kilovoltage can be made for any age from 1 to 14 years.

THE USE OF CONES

Few operators realize the importance of cones when doing radiographic work. The cone used for any radiograph should be just large enough to cover the anatomical area under examination. Using a cone just large enough to cover the desired area will reduce secondary radiation from surrounding tissues and produce a radiograph with much more contrast. Most charts furnished with x-ray units indicate what cone to use for each anatomical part.

FLUOROSCOPY

Before attempting to do fluoroscopic work, carefully read the section on fluoroscopy. Care should be exercised to make sure that the fluoroscopic shutters are in the open position when doing radiographic work. An arrow on the fluoroscopic shutter control casting indicates the direction the shutters are to be moved for the open position.

DARK ROOM

90% of radiographic failures are due to dark room difficulties. Careful study of the section on dark room technic will reduce radiographic failures to a minimum.

NON BUCKY TECHNIC

Should it be desired to dispense with the use of a bucky diaphragm or stationary grid and use only a cassette equipped with hi-speed screens, comparative densities can be obtained by reducing the kilovoltage 13 kilovolts below that shown for the thickness of the part or use 1/3 of the time indicated when using a bucky diaphragm. Better results will be obtained if the kilovoltage is reduced and the time factor remains the same as indicated for bucky technic.

POSITIONING INFORMATION

Depth measurement - The measurement in centimeters for any particular structure should be along the line of central ray projection.

Chest AP - Measure at plane between 5th and 6th dorsal and approximately 3 to 5 c.m. one side of the spine medium line. Chest should be taken in the standing position using a wall mounted cassette holder. Place back of hands on patient's hips. Bend elbows out to permit shoulders to come as close to the film as possible. Center tube at 5th or 6th dorsal.

Chest LATERAL - Measure patient with arms down, sliding centimeter caliper between arms and patient's body. Make measurement on a line with lower margin of scapula. Patient's arms are then raised above head. Center tube on line of measurement.

A.P. Lumbar-Pelvis - Caliper at point $2\frac{1}{2}$" below sternum as a measure of both full kidney and urinary tract and full lumbar and pelvis. For spine and bone work, the entire portion of the body between a point $2\frac{1}{2}$" below sternum through the first two-thirds of the femur may be considered lumbar pelvic grouping. The lower third of the femur takes the extremity grouping. Center tube at 3rd or 4th lumbar.

Lumbar and Sacrum LATERAL - For lateral lumbar spine center spine with center of table. Measure $1\frac{1}{2}$" above crest of ilium and center tube at that point.

Cervical Spine A.P. and LATERAL - Measure in plane of cervical dorsal junction.

LATERAL Sinus - Measure across forehead approximately on line drawn between frontozygomatic sutures and center one-half way along line between external meatus and outer canthus.

Frontal Sinus P.A. - Place patient face down on table. Have nose and forehead touching table top. Tilt x-ray tube 12° towards the feet. Direct central ray to center of film.

Maxillary Sinus - Patient in prone position. With full weight of head resting on the chin, the head is tilted until a line between the external meatus and the outer canthus of the eye forms an angle of 37° with the table top. X-ray tube is not angled. Direct central ray to center of film.

Sphenoid Sinus, Open Mouth - Patient in prone position. Head resting on chin and nose with mouth open. Tilt tube 20° towards patient's feet. Central ray should pass half way between upper and lower lips when mouth is open.

Mastoid LATERAL - Patient is placed in prone position. Permit head to assume a natural position, with the weight on the cheek. Tilt tube 15° toward patient's feet. Center $1\frac{1}{2}$" above and $1\frac{1}{2}$" behind the tip of the ear. When possible, fold ear forward.

Sternum Oblique - Place patient in prone position. Rotate patient slightly to eliminate superimposition of spine over sternum.

Atlas and Axis - Patient is placed on the table in the supine position with the median line of the body over the center line of the table. The chin is elevated until the occlusal surface of the teeth is vertical with the table top. With the mouth wide open, the film is entered half way between upper and lower lip. The central ray is directed to the center of the film.

Wrist P.A. - The forearm is placed on the table top with the palmar surface down. The wrist is centered to the film by placing the midpoint between the styloid processes over the center of the film. Direct central ray to center of film.

Wrist LATERAL - Place styloid process of the ulna over center of the film. Direct central ray to center of film.

Elbow LATERAL - When possible the arm is flexed to approximately 45° angle. The hand is turned sideways with thumb up. The medial epicondyle is centered on the film. Direct central ray to center of the film.

Elbow A.P. - The back of the arm and forearm are placed on film holder. The mid-point between the epicondyles is placed in the center of the film. Direct central ray to film. Place a sandbag in patient's hand.

Shoulder A.P. - Patient in supine position. Elevate opposite shoulder with sandbags or pillow to bring shoulder to be radiographed closer to film. Arm is abducted with palmar surface of hand upward. Place sandbag in patient's hand.

Foot A.P. - Patient may lie or sit on table with knee flexed at an acute angle, the plantar surface of the foot resting on film holder. The proximal end of the second metatarsal is centered to the film. Tilt tube 15° towards patient's head and direct central ray to center of film.

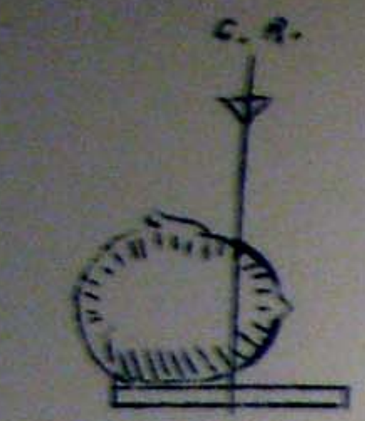
Foot LATERAL - Patient is placed in the lateral position with leg slightly flexed and supported by sandbags at knee. A point approximately 1/2 the distance from the great toe to the heel is centered on the film. Direct central ray to center of film.

Ankle A.P. - Place patient in the supine position with heel resting on film holder. Place sandbag under knee. The lower tip of the internal malleolus is centered on the film. Direct central ray to center of film.

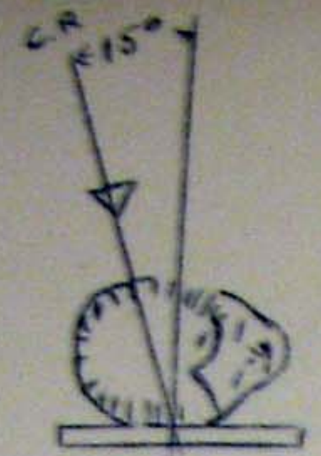
Ankle LATERAL - Place patient in lateral position. The ankle is placed on the film with the external malleolis on the film. The opposite leg is crossed over. The lower tip of the external malleolis is centered on the film. Direct central ray to center of film.

Knee LATERAL - Place patient on table with affected knee resting on film. Center lower margin of patella on center of film. Direct central ray to center of film.

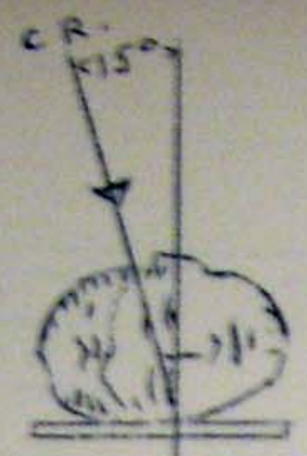
Knee P.A. - Place patient in prone position. Place sandbags under ankles to support toes. Lower margin of patella is placed in center of film. Direct central ray to center of film.



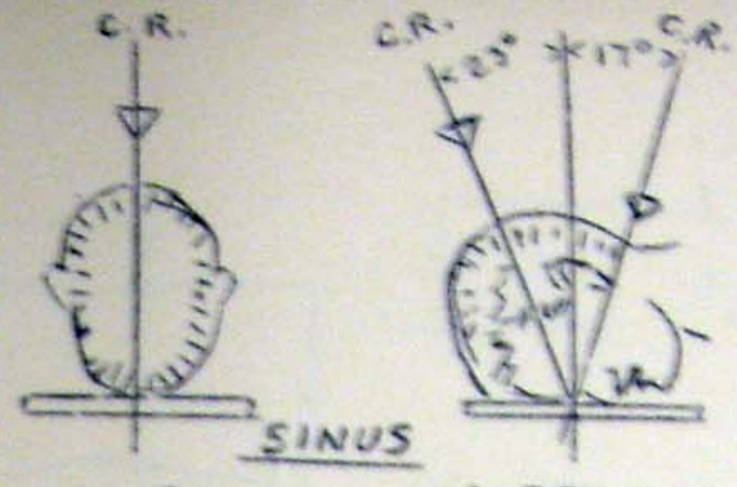
SINUS LAT.



MASTOID
FOR BUCKY



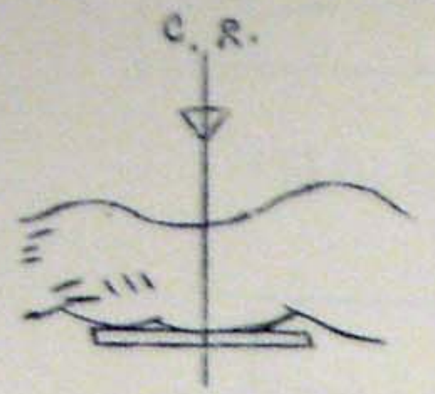
MASTOID
DOUBLE ANGLE



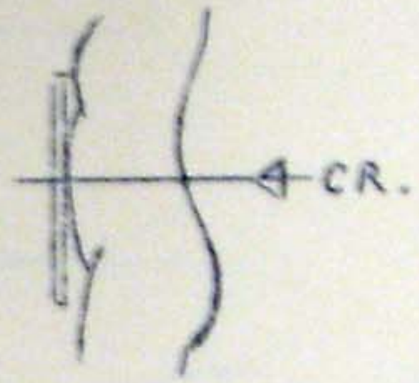
SINUS
FRONTAL 23°-SPHENOIDS 17°



JAW

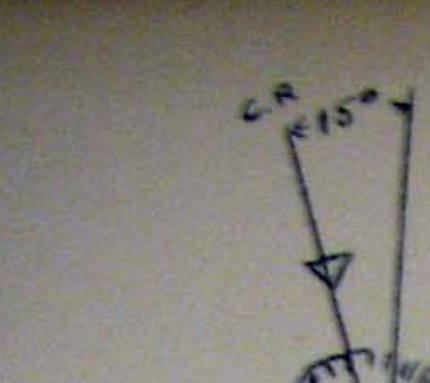


GI. PRONE



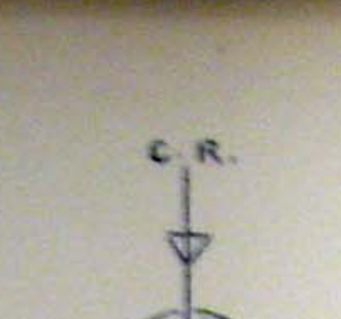
GI. ERECT

PA. CHEST

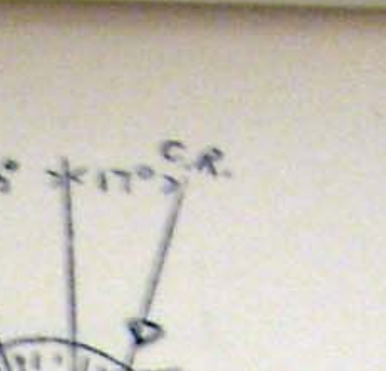


LAT. CHEST

LAT. CEVICAL



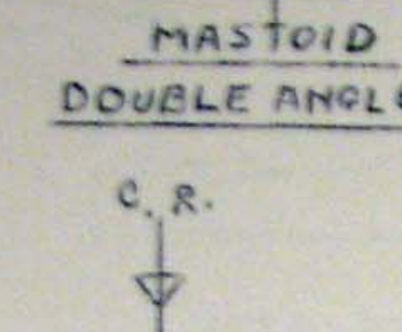
AP. CEVICAL



LAT. LUMBAR



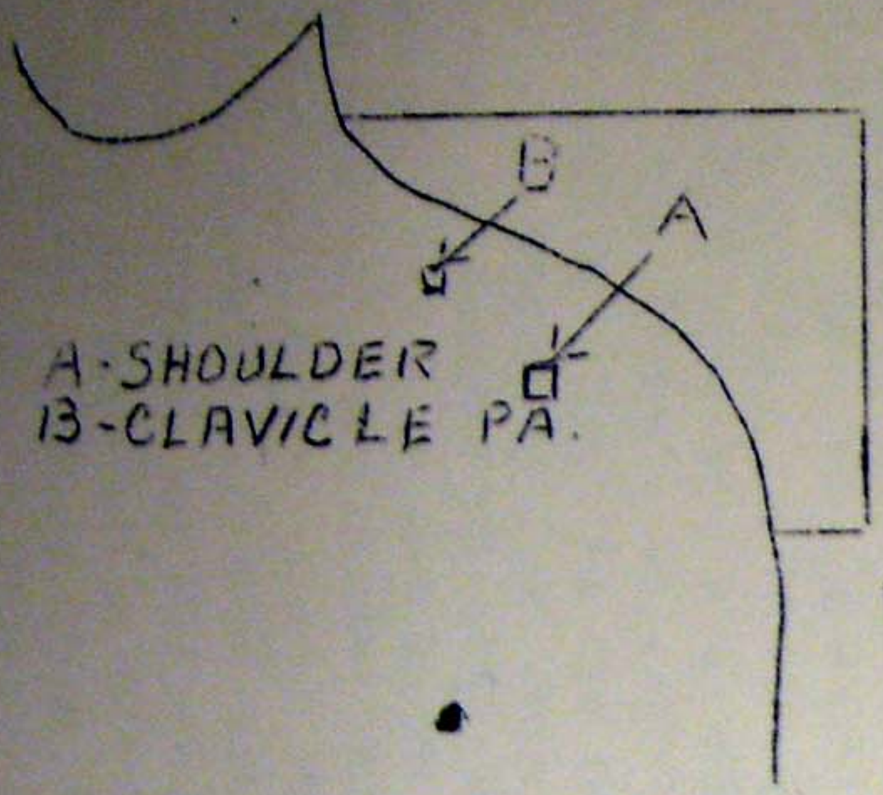
AP. LUMBAR



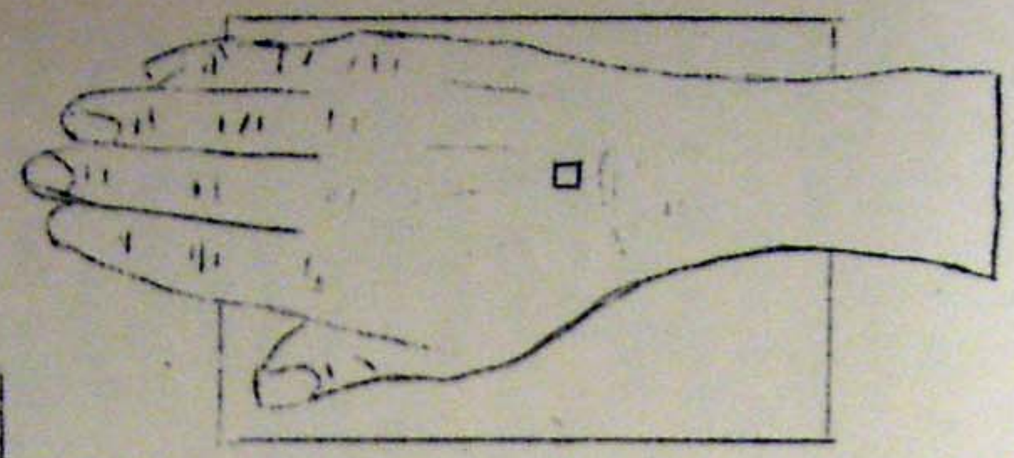
LAT. LUMBAR



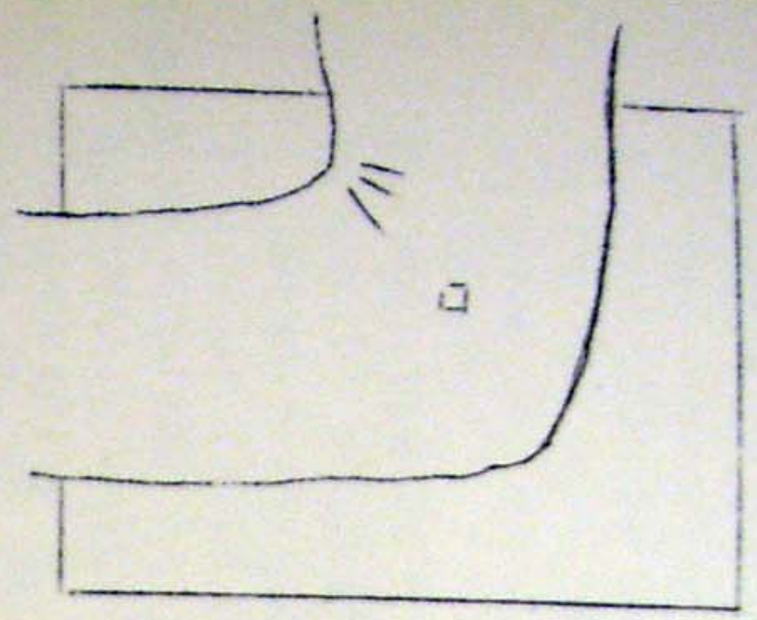
AP. DORSAL



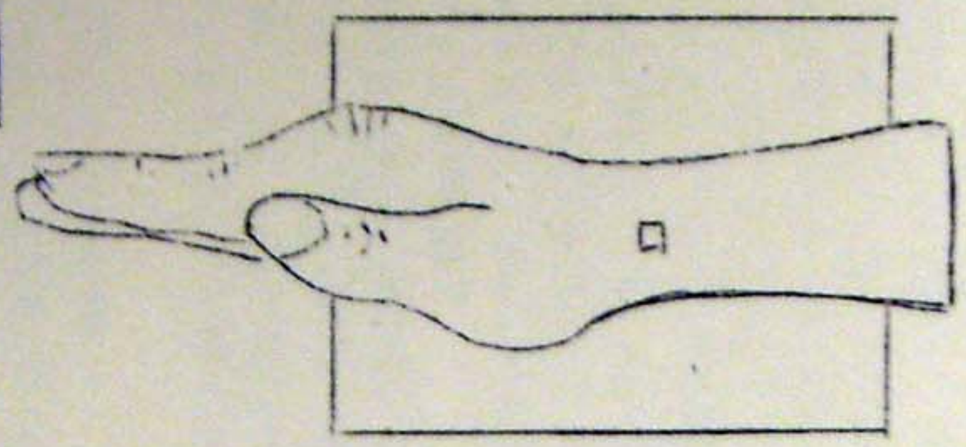
A-SHOULDER
B-CLAVICLE PA.



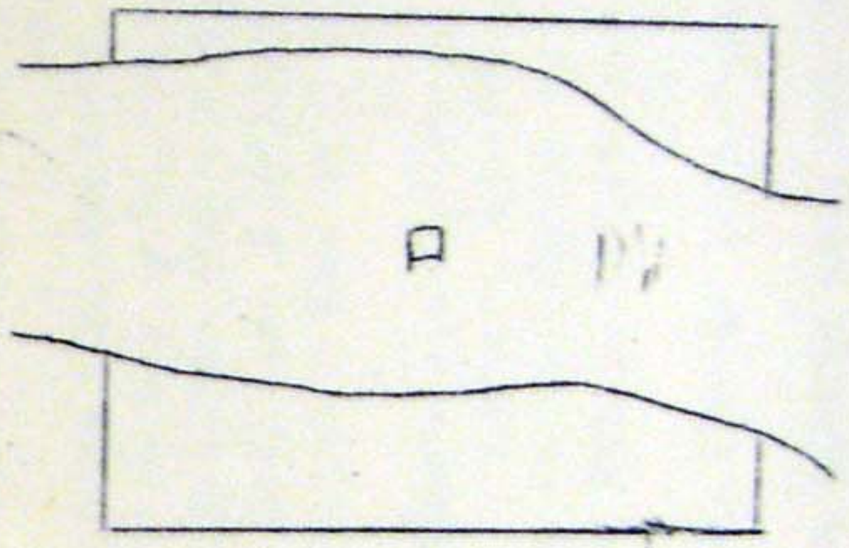
HAND PA.



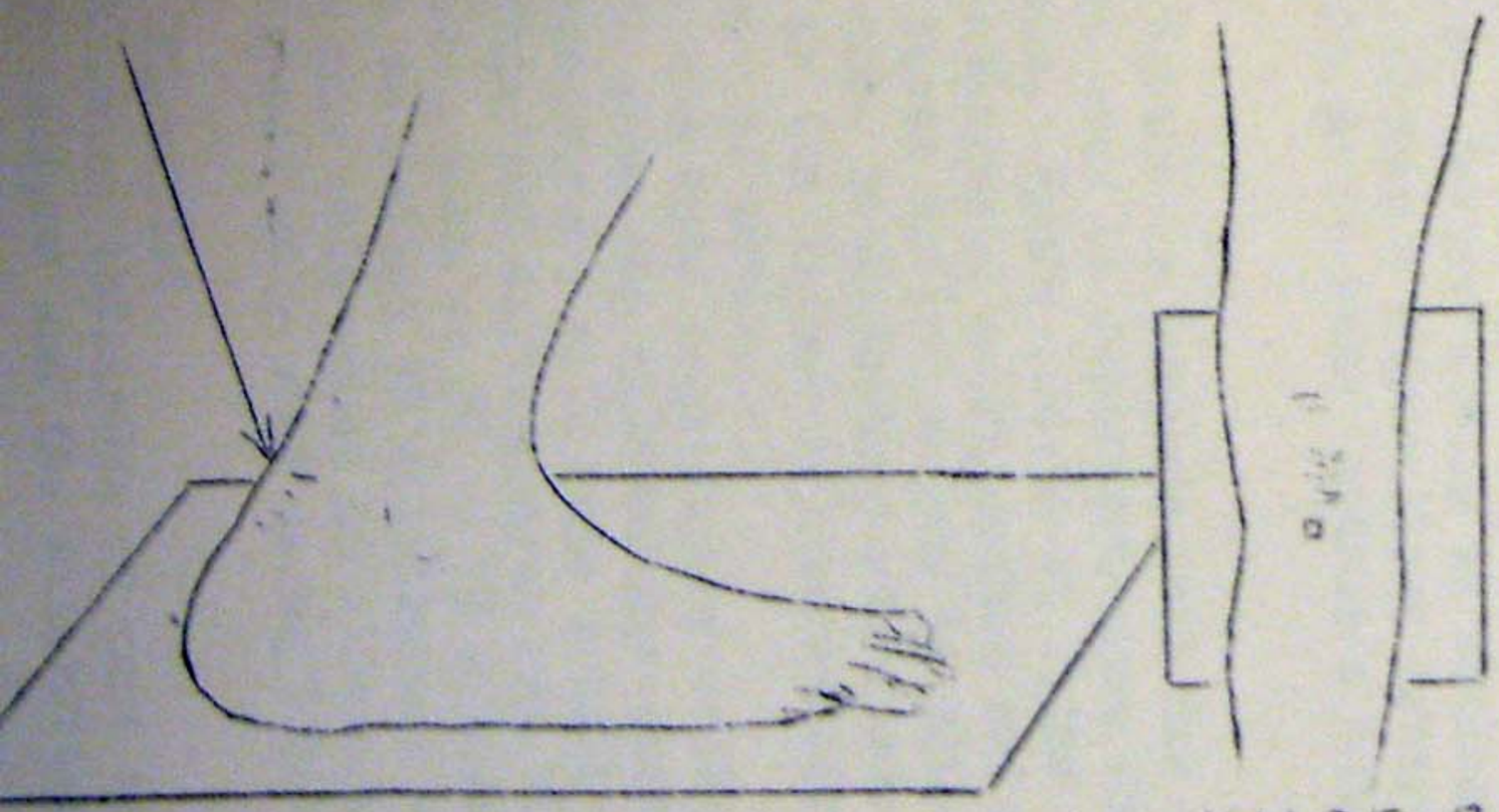
ELBOW LAT.



WRIST LAT.



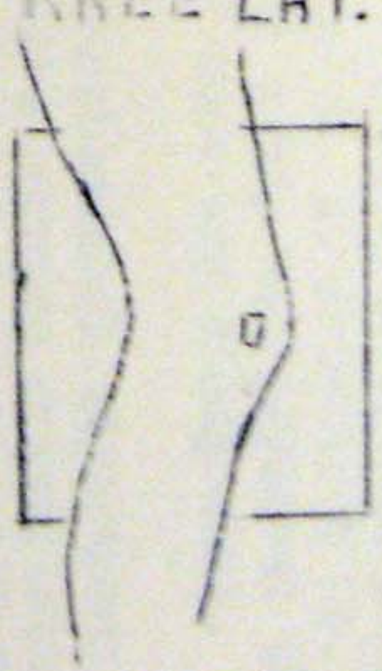
ELBOW AP.



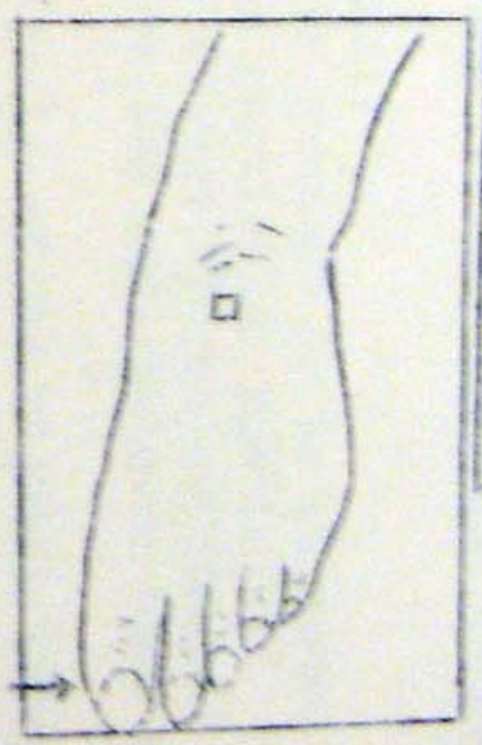
OS-CALCIS

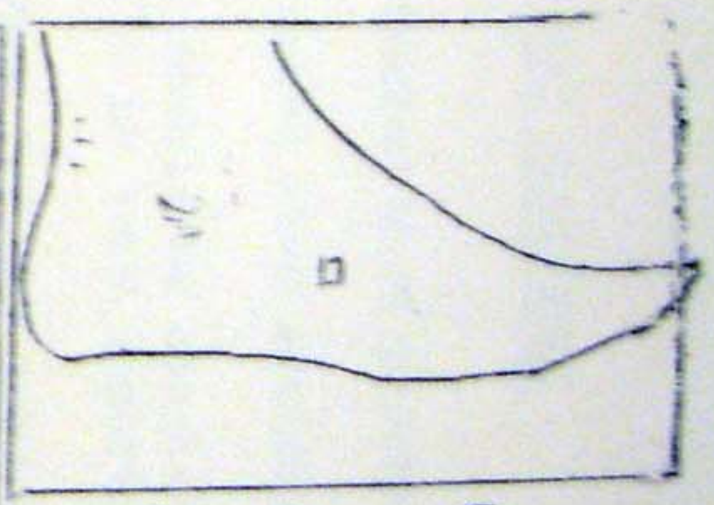
KNEE AP.

KNEE LAT.



FOOT AP





FOOT LAT.

FACTORS TO BE CONSIDERED WHEN PURCHASING X-RAY EQUIPMENT

Question: What are the chief factors that should be considered when purchasing x-ray equipment?

Answer: There are several factors that should be considered when anticipating the purchase of x-ray equipment.

1. The integrity and reputation of the company should be considered.
2. The ability to service equipment in the field is very important.
3. Is the equipment of modern design?
4. Does the equipment offered have adequate power for the work you intend to do?
5. Does the unit have a fine and flexible control?
6. Is the equipment especially designed for your purpose or is it something designed years ago and adapted to your particular specialty?
7. Is the price in keeping with the design and output of the equipment?

Question: What bearing has the integrity and reputation of the manufacturer have on purchasing x-ray equipment?

Answer: The integrity and reputation of the manufacturer is of the highest importance. H. G. Fischer & Co. has established a reputation over a long period of years for fair dealing with the profession and pricing of equipment in keeping with the quality offered. The origin of H. G. Fischer & Co. dates back 39 years and is the oldest manufacturer of x-ray and physical therapy equipment operating under the original company name and management.

Question: Why is field service so important?

Answer: All electrical and mechanical devices require occassional adjustment. H. G. Fischer & Co. maintains a nation wide field service organization for the purpose of rendering efficient service on your equipment. All Fischer representatives are factory trained.

Question: What is meant by modern design?

Answer: By modern design we mean equipment that is especially designed for a particular use and incorporating all the modern features such as automatic selection or presetting of milliamperage, flexible kilovoltage controls, stereoscopic shift and other features which go to make technic a matter of precision.

Question: What is meant by adequate power?

Answer: The power required depends upon the time factor in seconds that the operator desires to use. The permissable time used is dependent upon the ability of the patient to remain motionless. Heart and chest films should be taken at 72 inches and 1/10 second to eliminate heart motion and reduce distortion. The stomach usually must be taken in 1/2 second to eliminate peristalic action. Full spines are much more satisfactory when made at 60 inches with high milliamperage values as the higher milliamperage permits shorter exposure time with less chance of motion.

Special attention should be paid to the tube transformer ratings.. Reputable manufacturers do not hesitate to show the kilovoltage obtained at any given milliampere load. Some manufacturers will rate a unit as 100 KV - 100 MA. However, a check will show that 100 milliamperes can only be obtained when using a low kilovoltage value, such as 65 to 75 kilovolts. This situation is especially prevalent on so called 30 milliampere - 90 kilovolt machines which in many cases produce only about 60 kilovolts at 30 milliamperes. The 90 kilovolts is obtained only when using 5 milliamperes.

Question: Why should the x-ray control be fine and flexible?

Answer: Modern day x-ray technic calls for a centimeter thickness of part technic. The patient is measured with a centimeter caliper and the kilovoltage is

adjusted for that particular thickness of tissue. As each centimeter of tissue requires a change of 2 kilovolts, it is obvious that x-ray controls with 9 to 15 steps of control are not adequate as each step of voltage control represents kilovoltage jumps of 5 to 8 kilovolts. With coarse voltage steps as described, it is impossible to accurately adjust the kilovoltage for the thickness of part. The only alternative is to compensate with time for the discrepancy in voltage which necessitates that the operator resort to hunch or guesswork. It requires years of experience to become a good hunch technician.

Question: What is meant by specialized equipment?

Answer: Many manufacturers have one standard design and try, by making a few minor changes to adapt this design to all types of x-ray work. This has proven to be very unsatisfactory. H.G. Fischer & Co. have always built special equipment for the particular specialty. In designing equipment for any special radiographic work, every attempt is made to consult with outstanding men in the profession in order to give the user the ultimate in efficiency.

Question: What about price?

Answer: Price is important but not paramount. All equipment of quality must bear a price in proportion to the skill, time, experience and work attending their creation and manufacture. Things called expensive when justly estimated are usually the cheapest. Equipment built for cheapness and not for excellence of workmanship and end results is the most frequent and certain cause for dissatisfaction on the part of the customer.

Question: When comparing prices, what should be considered?

Answer: 1 - Does the price quoted include installation by a competent service representative?
2 - Does the price quoted include complete technical instructions by a trained company representative?
3 - Does the manufacturer have an advertised sales price or does the dealer charge any price he may see fit?
4 - Is the trade-in allowance fair or is the dealer boosting the list price in order to allow a greater trade-in allowance?
5 - What accessories are included in the sales price? Are such items as foot switch, cone, filter, timer, stabilizer etc. charged as extras in order to bring the base price down?
6 - What assurance do I have of service after the installation is made?
7 - Is the Company reliable?
8 - How long has the Company been in business?
9 - Will I be able to get service 10 years from now?

The above factors should be given the most serious consideration when contemplating the purchase of equipment. H. G. Fischer & Co. build equipment to fit every price range and every radiographic and fluoroscopic need and is backed up by 39 years of manufacturing know how.

TECHNIC CHART
(Use of)

The x-ray technic chart enclosed in this manual is one made up for a Fischer De Luxe 100 X-ray Unit. However, this chart can be adapted to any machine up to and including 100 milliamperes in capacity. For instance, if the machine you desire to use has a capacity of 25 milliamperes employ the time factors shown in the 25 milliampere column and the voltage technic shown on the left hand side of the chart which will give the desired density for the screens and films you are using. If the machine has a capacity of 50 milliamperes employ the time factors shown in the 50 milliampere column. In other words use the time factors shown in the milliampere column corresponding to the milliampere capacity of your machine. The kilovoltage will be the same regardless of what milliampere factor is used. On x-ray units of 100 milliamperes or less high speed screens should be used. Ordinarily the voltage technic shown in voltage technic #2 will give proper density. However, if the screens are old or slow it may be necessary to employ voltage technic #3 or possibly #4 to secure the proper density.

Initial Anode-Film Distance	To Change Focal Distance Factors							
20"	1.0	1.6	2.3	3.2	4.0	5.8	9.0	13.0
25"	.64	1.0	1.4	2.1	2.6	3.7	5.8	8.3
30"	.44	.69	1.0	1.4	1.8	2.6	4.0	5.8
36"	.31	.48	.69	1.0	1.2	1.8	2.8	4.0
40"	.25	.39	.56	.81	1.0	1.4	2.3	3.2
48"	.17	.27	.39	.59	.69	1.0	1.6	2.3
60"	.11	.17	.25	.36	.44	.64	1.0	1.4
72"	.08	.12	.17	.25	.31	.44	.69	1.0
New Anode-Film Distance	20"	25"	30"	36"	40"	48"	60"	72"

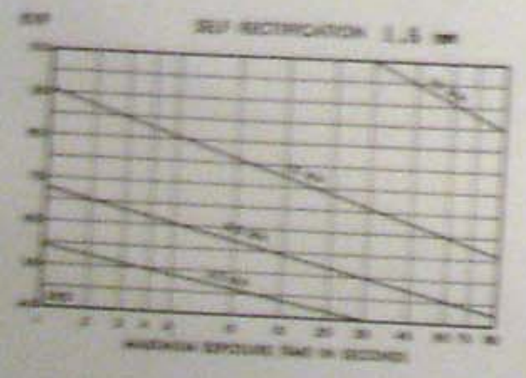
Radiographic Technic Chart

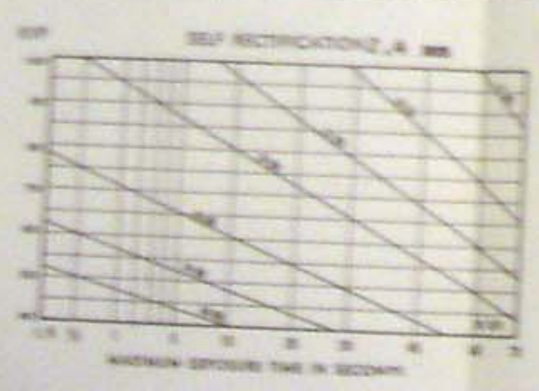
DE LUXE MODEL

RF-100 Shockproof X-Ray Apparatus

Thickness of Part in Inches	kVp.	mA.	Time	Tube Target
5	60	100	1/10	5
6	64	100	1/10	5
7	68	100	1/10	5
8	72	100	1/10	5
9	76	100	1/10	5
10	80	100	1/10	5
11	84	100	1/10	5
12	88	100	1/10	5
13	92	100	1/10	5
14	96	100	1/10	5
15	100	100	1/10	5
16	104	100	1/10	5
17	108	100	1/10	5
18	112	100	1/10	5
19	116	100	1/10	5
20	120	100	1/10	5
21	124	100	1/10	5
22	128	100	1/10	5
23	132	100	1/10	5
24	136	100	1/10	5
25	140	100	1/10	5
26	144	100	1/10	5
27	148	100	1/10	5
28	152	100	1/10	5
29	156	100	1/10	5
30	160	100	1/10	5
31	164	100	1/10	5
32	168	100	1/10	5
33	172	100	1/10	5
34	176	100	1/10	5

Thickness of Part in Inches	40 MA. Through 1.0 mm. Focus		40 MA. Through 0.5 mm. Focus		20 MA. Through 0.3 mm. Focus		40 MA. Through 1.0 mm. Focus		20 MA. Through 0.5 mm. Focus		10 MA. Through 0.3 mm. Focus	
	Screens	Screens	Screens	Screens	Screens	Screens	Screens	Screens	Screens	Screens	Screens	Screens
	Out	Back	Out	Back	Out	Back	Out	Back	Out	Back	Out	Back
Hand												
Skull	AP-PA	2 1/2	7 1/2	1/10	5	1	3	1/2	1 1/2	1/10	1/2	1/10	1/2
Skull	Lateral	2 1/2	7 1/2	1/10	5	1	3	1/2	1 1/2	1/10	1/2	1/10	1/2
Sinuses (Nasal)	PA	3 1/2	11	1 1/2	7 1/2	1 1/2	4 1/2	1/2	2 1/2	1/10	1/2	1/10	1/2
Mastoids	PA	3 1/2	11	2 1/2	7 1/2	1 1/2	4 1/2	1/2	2 1/2	1/10	1/2	1/10	1/2
Mastoid	Obl.	3 1/2	10	2 1/2	6 1/2	1 1/2	4	1/2	2	1/10	1/2	1/10	1/2
Jaw	Lateral	3 1/2	10	2 1/2	7	1 1/10	4	1/2	2	1/10	1/2	1/10	1/2
Shoulder												
Shoulder	AP	2 1/2	7 1/2	1/10	5	1	3	1/2	1 1/2	1/10	1/2	1/10	1/2
Clavicle	AP-Lat.	2 1/2	7 1/2	1/10	5	1	3	1/2	1 1/2	1/10	1/2	1/10	1/2
Clavicle	AP-Lat.	10		7		4		2		1		1/2	
Thorax	AP	2 1/2	7 1/2	1/10	5	1	3	1/2	1 1/2	1/10	1/2	1/10	1/2
Thorax	Lateral	1/10	3/10	1/10	2 1/2	1/2	1 1/2	1/2	1	1/10	1/2	1/10	1/2
Lumbar	AP	4	12 1/2	2 1/10	8 1/10	1/10	5	1/2	2 1/2	1/10	1/2	1/10	1/2
Lumbar	Lateral	7 1/2	22 1/2	5	16	3	9	1 1/2	4 1/2	1	3		
Pelvis	AP	4	12 1/2	2 1/10	8 1/10	1/10	5	1/2	2 1/2	1/10	1/2	1/10	1/2
Knee													
Knee Stereoscopic	AP-Lat.	1/2	2	1/2	1 1/10	1/2	1/2	1/2	1/2				
Knee Stereoscopic	AP-Obl.	3 1/2	10	2 1/2	7	1 1/2	4	1/2	2	1/10	1/2	1/10	1/2
Chest	**Heart**												
Chest	PA.	1/2		1/10		1/10		1/10				1/10	
Chest	Lat.	1		1/10		1/10		1/10				1/10	
Chest	PA.	1		1/10		1/10		1/10		1/10		1/10	
Chest	Lat.	1 1/2		1		1/10		1/10		1/10		1/10	
Gi-Gall-Bladder-Kid.													
Stomach	Obl.	1	3	1/10	2	1/10	1 1/10	1/10	1/2	1/10	1/2	1/10	1/2
Duodenum	AP-PA-Obl.				1 1/10	1	3	1/2	1 1/2	1/10	1/2	1/10	1/2
Kidney	AP-PA	2 1/2	7 1/2	1/10	5	1	3	1/2	1 1/2	1/10	1/2	1/10	1/2
Gall-Bl.	PA	2	6	1/10	4	1/10	2 1/2	1/10	1 1/2	1/10	1/10	1/10	1/10
Miscl.													
Extremities	ALL	2	7 1/2	1 1/10	5	1	3	1/2	1 1/2	1/10	1/2	1/10	1/2
Pelvis	AP-PA-Lat.	5	16	3 1/2	10	2	6	1	3	1/10	1	1/10	1/2
Abdomen	AP-Lat.	1		10		1/10		1/10		1/10		1/10	

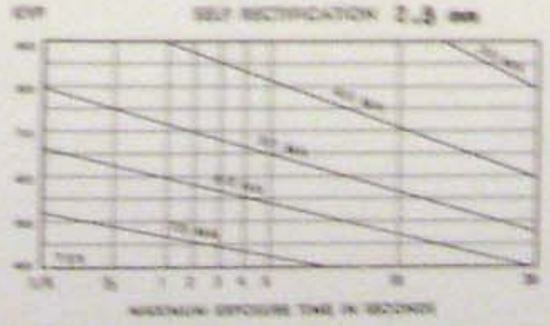




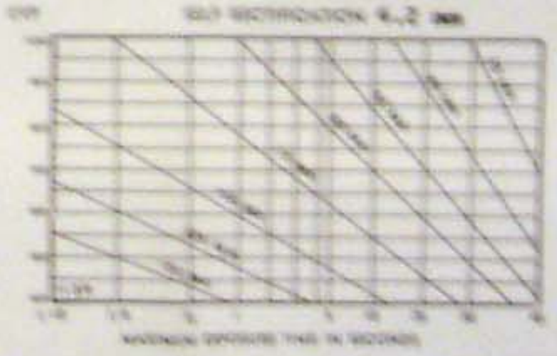
FLUOROSCOPIC RATING IS ALL FOCAL SPOTS 60 KVP-5 MA. - 10 MIN.

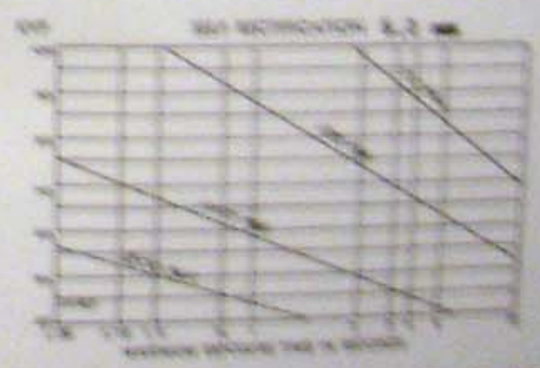
THE MAXIMUM TIME of exposure will be found by following the horizontal voltage line to its intersection with the diagonal Ma. line and then dropping vertically down to the base time line.

Extremity Technic Fig. - Dorsum or Plantar Aspect Screen Films 30 Distance 40 Milliampere Seconds																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
KVP.	32	34	37	39	42	45	47	50	52	55	58	60	63	65	68	70	73	75
For Laterals, Use 100 MA Increase Exposure Time 50 %																		



ALL TUBE LOADING CHARTS BASED ON STARTING WITH TUBE AT ROOM TEMPERATURE





H. G. FISCHER & CO.
9451-91 W. BELMONT AVE. - FRANKLIN PARK, ILLINOIS

Fischer "PRECISION BUILT" X-RAY UNITS Simplify Radiographic Technic

The unit illustrated is only one of this extensive line . . . see others inside

New

DE LUXE MODEL RF

250 Milliampere

SHOCKPROOF X-RAY APPARATUS



H. G. FISCHER & CO.

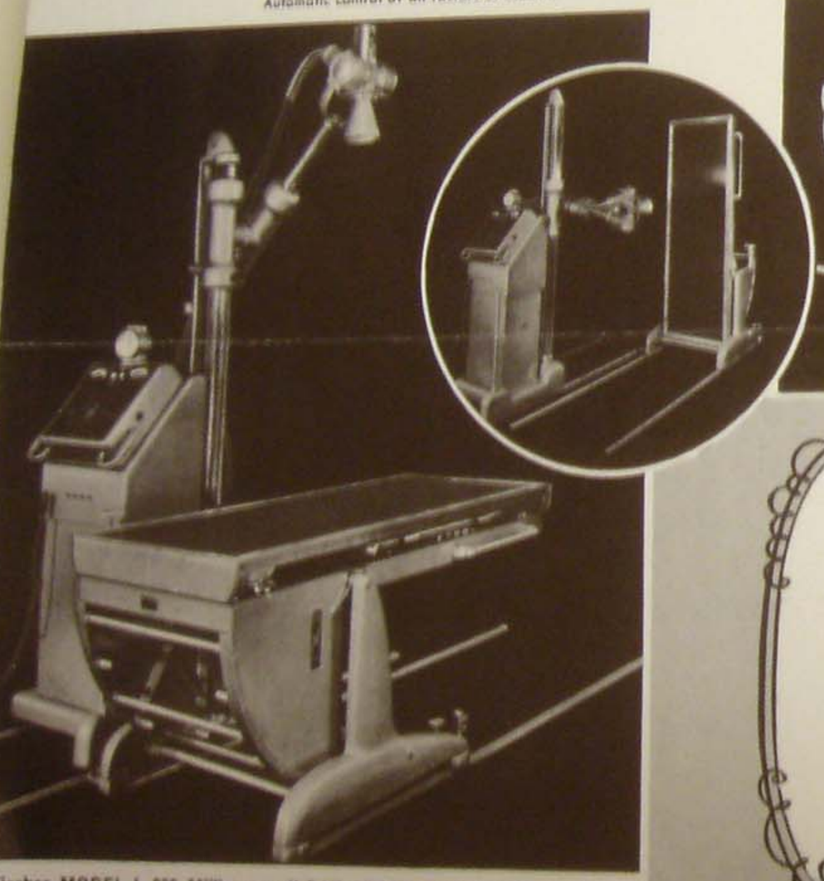
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Fischer DE LUXE MODEL RF 250 Milliampere X-RAY APPARATUS—For Vertical Fluoroscopy

Automatic control of all factors of technic.



Fischer MODEL L 200 Milliampere X-RAY APPARATUS with Tilt Table

A powerful unit recommended for 60" AP and lateral radiography in the vertical and horizontal positions.

High Qua… of Demon…

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Fischer DE LUXE MODEL RF 100 M… X-RAY APPARATUS with Fluoroscope-Mounted Tilt Tab…

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throughout the world greatly increase their services to patients with Fischer units. May we send you illustrated circulars showing units that may well meet your requirements? Return of the inclosed card will bring complete details on any Fischer model, and information as to low prices and our liberal payment plan.

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…ay Units … Efficiency

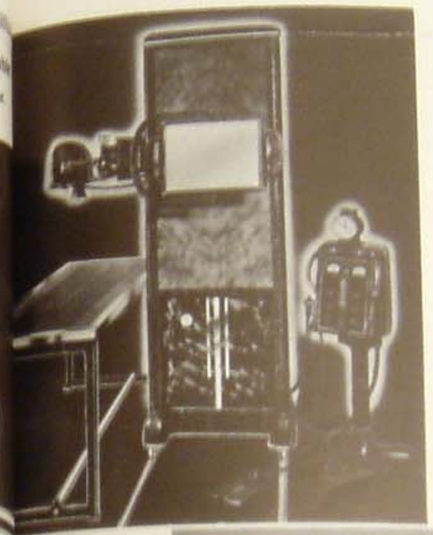
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Fischer MODEL 100 Milliampere X-RAY UNIT With Urological Table

Meets all requirements of modern urological technics. All desired settings of table and X-ray unit easily arranged.



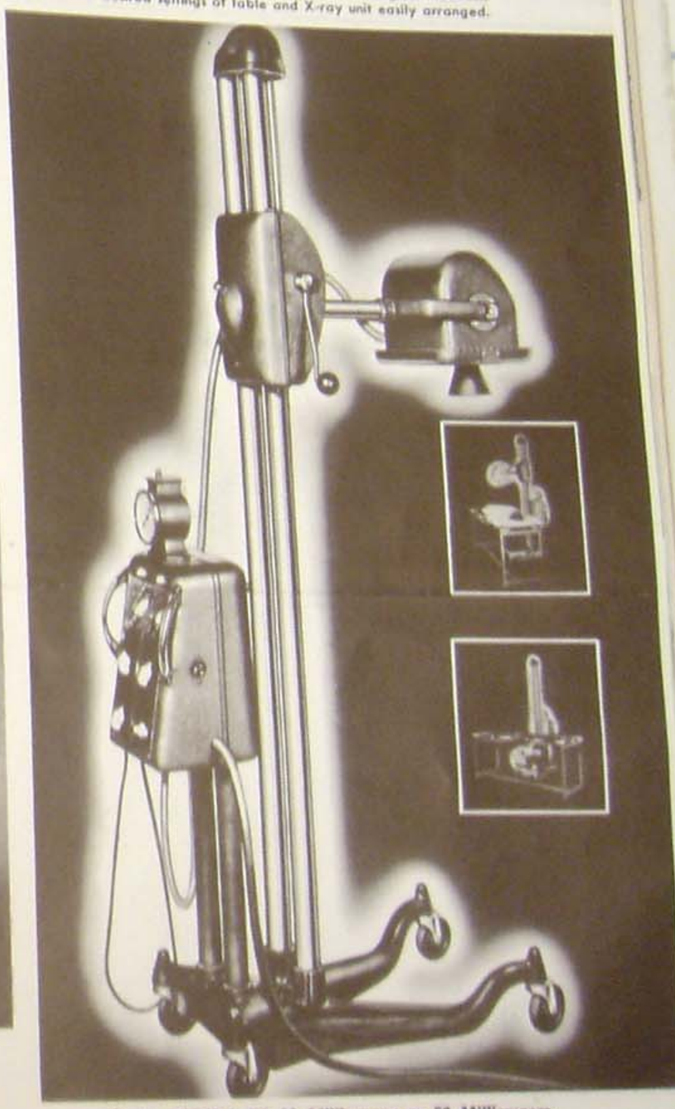
MODEL TF
30 Milliampere or 50 Milliampere FLUORO-SCOPIC X-RAY APPARATUS with Radiographic Facilities

Dependable power and exceptionally fine control. Great efficiency and durability.



Fischer DE LUXE, RAIL MOUNTED, REMOTE CONTROL MODEL TC 30 Milliampere and 50 Milliampere, with Roentgenographic Table

Beautiful, modernly designed X-ray unit for horizontal and vertical radiography—exceptionally fine milliamperage and voltage control.



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Extremely efficient, low priced unit with great flexibility.



Fischer DE LUXE MODEL 400 SHORT WAVE DIATHERMY UNIT
F.C.C. Type Approval, D-479

A.M.A. acceptance. Highest quality unit. Unexcelled performance in all types of short wave diathermy applications.

Fischer MODEL CK ULTRA VIOLET GENERATOR

Powerful Quartz and Corex burners.



Fischer MODEL J GALVANIC AND CONTRACTILE CURRENTS GENERATOR

16 distinct low voltage currents. Valuable in diagnosis and therapy. Patented features assure exact wave form.



ELECTROMEDICAL EQUIPMENT

Streamlined
Offering Years
Efficient Service
At Low Cost

May we send you information on these modern units and our liberal payment plan?

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Fischer TABLE MODEL 200 SHORT WAVE DIATHERMY UNIT
F.C.C. Type Approval, D-484

Mobile, portable. Patented, adjustable induction electrode gives deep, uniform heat to all parts of body.



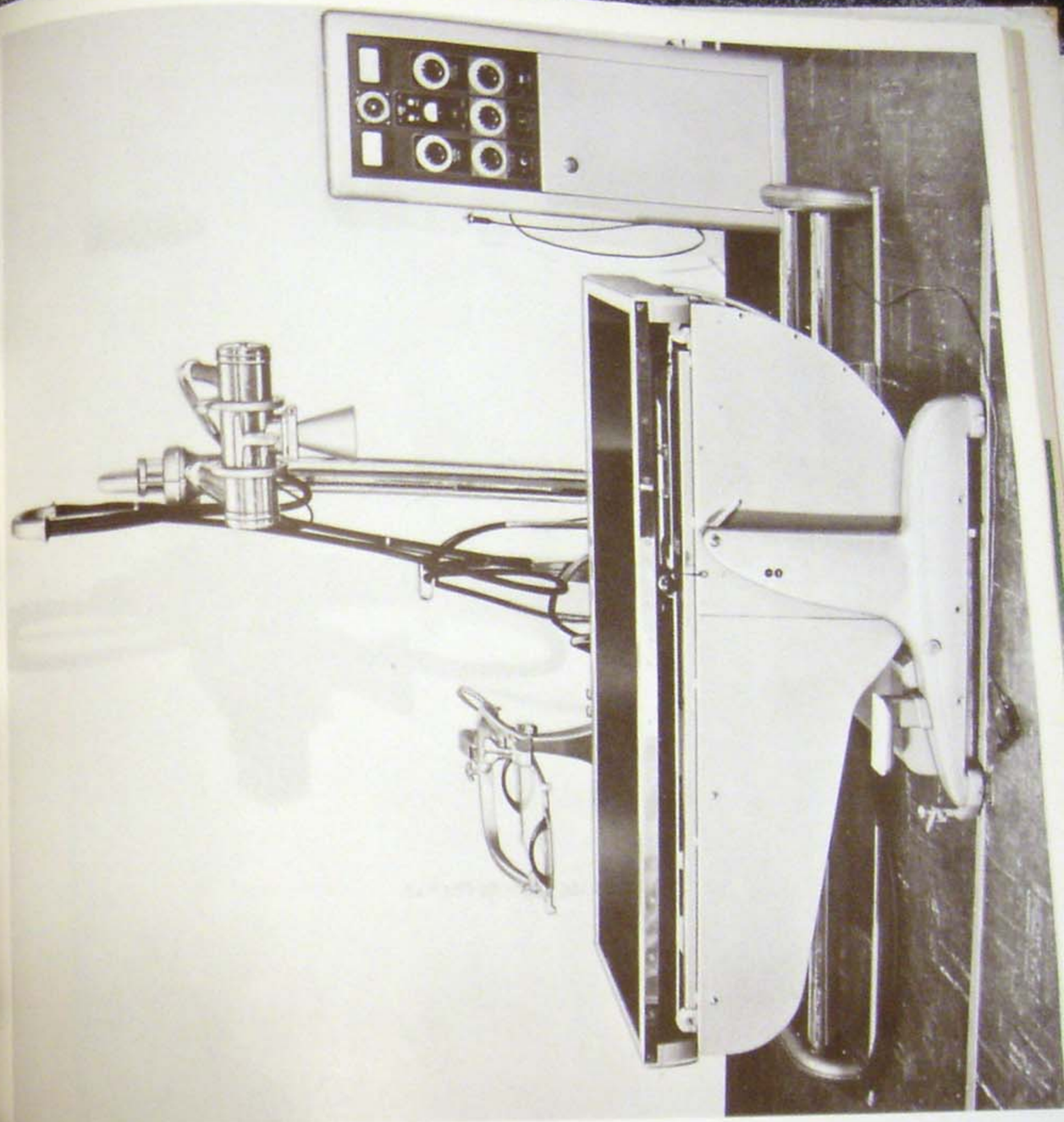
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H. G. FISCHER & CO. · FRANKLIN PARK, ILLINOIS

MANUFACTURERS OF X-RAY AND ELECTROMEDICAL EQUIPMENT

TELEPHONES: (Franklin Park) GLadstone 5-0612 · (Chicago) TUxedo

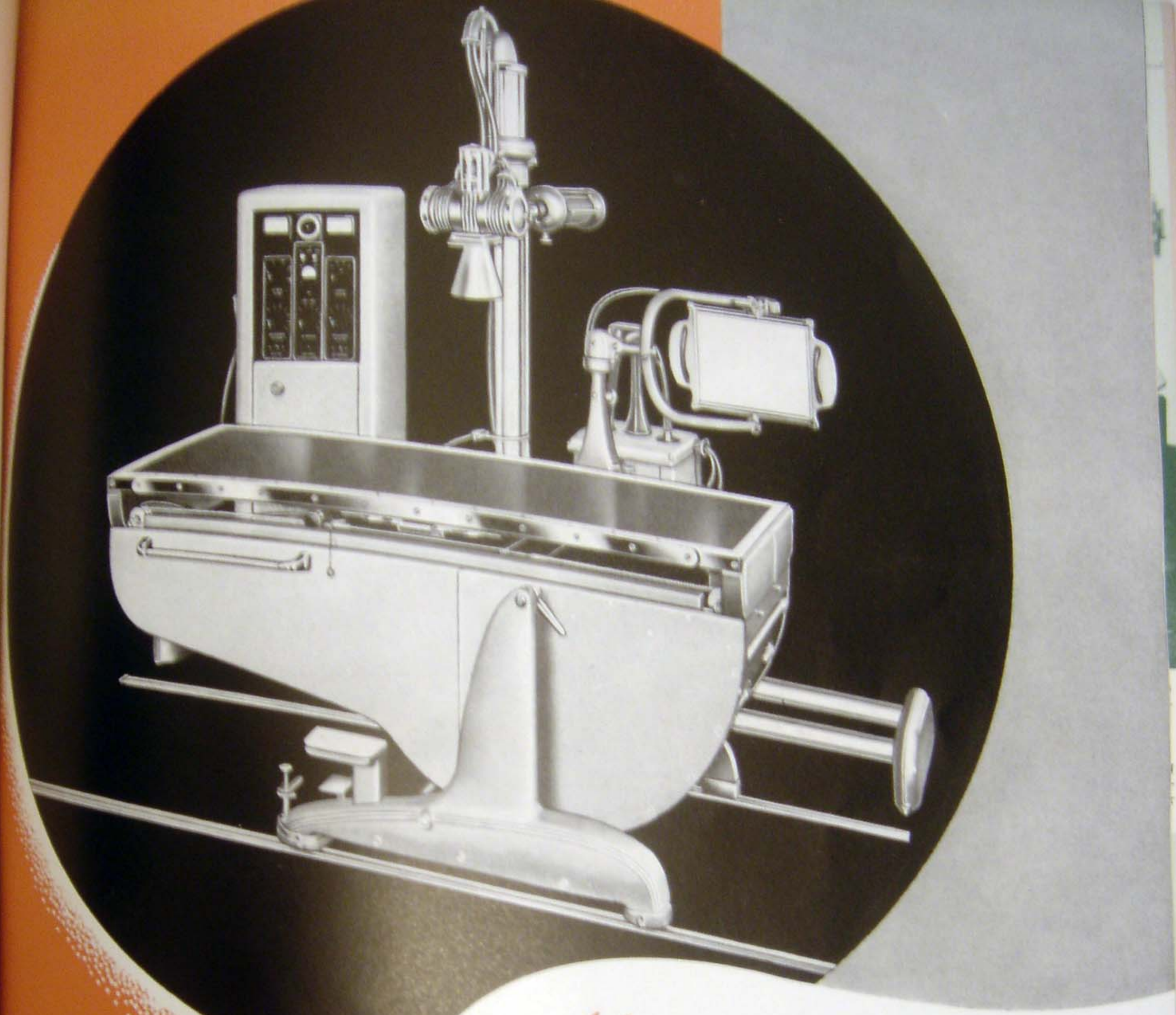
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Deluxe Model RF-250 X-ray Apparatus with Fluoroscope Mounted Motor Driven Tilt Table, having Seat and Shoulder Rest, 17" x 17" 1/2 second 50 line 30" focal distance Bucky, Compression Device, 1/20 second Automatic Reset Timer, Rails, Rollers and Blocks for Tilt Table, Foot Switch, Cone B and Filter, with one Stationary Anode Tube under table and one Rotating Anode Tube over table.

The DeLuxe HF-250 X-Ray Apparatus may be had with Hand Tilted Table or Motor Driven Table. It may be had with:

1. One stationary anode tube only
2. Two stationary anode tubes
3. One rotating anode tube only
4. One stationary anode tube and one rotating anode tube



New

DE LUXE MODEL RF

100 Milliampere

SHOCKPROOF X-RAY APPARATUS

H. G. FISCHER & CO.

AUTOMATIC CONTROL • RADIOGRAPHIC-FLUOROSCOPIC COMBINATION

COMBINATION FLUOROSCOPIC RADIOGRAPHIC X-RAY

DISTINCTIVE IN THE FIELD OF RADIOGRAPHY

The new H. G. FISCHER & CO. De Luxe Model RF 100 Milliampere Shockproof Radiographic-Fluoroscopic X-ray Apparatus combines accurate, simple, automatic control of all desired radiographic settings of 5, 10, 25, 75 and 100 Mia., from 30 to 100 PKV. A fully counter-balanced tilting table permits X-ray and fluoroscopic examinations in all positions from Trendelenburg to vertical. The De Luxe Model "RF-100" incorporates features of construction backed by more than 38 years' leadership in design, development and manufacture of reliable, high quality X-ray and electromedical equipment by the finest X-ray and electrical engineering craftsmen. The compact, flexible, sturdily constructed De Luxe Model "RF 100" meets the need for a powerful, efficient radiographic-fluoroscopic X-ray unit that can be installed in a small space.



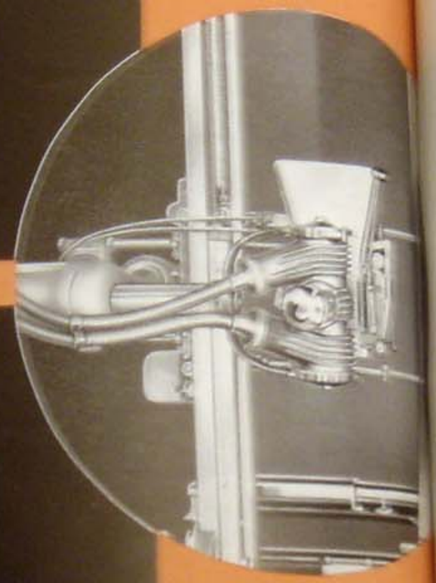
HORIZONTAL FLUOROSCOPY



VERTICAL RADIOGRAPHY



Vertical Fluoros





Angular Fluoros

Automatic control of all factors of technic permits radiographic and fluoroscopic examinations with the newly designed FISCHER De Luxe Model RF 100 Milliampere Shockproof X-ray apparatus to be accomplished easily, quickly and accurately. Moderately priced, flexible and efficient, the FISCHER De Luxe "RF-100" is a worth while investment and one that can be relied upon to pay dividends of excellent results and operating economy, with long, satisfactory, trouble-free service.

THE DELUXE "RF-100" TILTING BUCKY RADIOGRAPHIC-FLUOROSCOPIC TABLE

Delicate balance of the table permits finger-tip operation in all positions. Pressure on the guarded foot pedal releases a positive lock which permits use of the table in any one of eight positions, from Trendelenburg to vertical; intermediate stops at every 15°. Rail mounting of the table, permitting a lengthwise travel of 5 ft., enhances its flexibility when installed in small quarters.

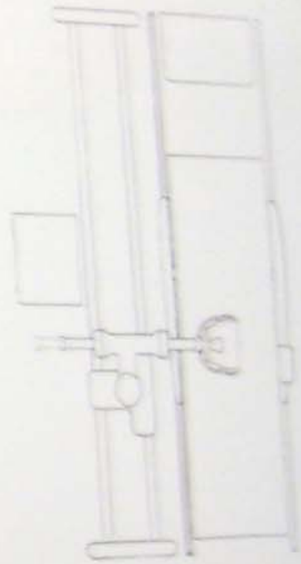
The fluoroscopic screen staging is mounted on a specially designed carriage for smooth operation on both cross and horizontal travel. Large ball-bearing surfaces provide easy movement and long service.

A special self-aligning guide plate is attached to the fluoroscopic shutter mechanism which permits coupling of the tube to the shutter for fluoroscopic work. Locking of the tube to the shutter mechanism is automatic and self-centering. No locking screws or clamps are necessary. This coupling operation permits changing to the fluoroscopic set-up even in a dark room, and can be accomplished with the table in any position without disturbing the patient.

The 17" x 17" Bucky diaphragm is extremely sturdy in construction and incorporates a 50 line grid with a filter ratio of 6 to 1. An interlocking device automatically centers the tubestand on the Bucky diaphragm longitudinally, permitting the tubestand and Bucky to move in unison the entire length of the table.

A heavy duty tubestand with a manually operated lateral stereoscopic shift of 12 inches is mounted on two parallel rails close to the floor. Provisions are incorporated for leveling the floor rails both laterally and longitudinally by means of leveling screws. The tubestand is so constructed as to permit manipulation from over-the-table to under-the-table positions with a minimum of effort. The sturdy construction of the tubestand and floor rails makes possible the use of either the regular double focus oil immersed tube or the double focus oil immersed rotating anode tube, which can be furnished as optional equipment at additional cost.

A specially constructed heavy duty shockproof oil immersed X-ray tube is provided, together with shockproof cables of sufficient length to connect the tube with the transformer which is normally mounted beside the tubestand. Remote mounting of the transformer is possible by the use of longer cables.



The De Luxe "RF-100" occupies an overall space 8 ft. x 9 ft. 3 in., including standard length rails, table and control mechanism, permitting maximum crosswise travel of tubestand. Minimum height required for tubestand 7 ft. 4 in.



CONTROL FEATURES

De Luxe Automatic Control

The FISCHER De Luxe "RF-100" control mechanism incorporates many exclusive features which make radiography a simple, precise science. There is no guesswork when using the De Luxe "RF-100" radiographic and fluoroscopic unit. It eliminates as far as humanly possible every electrical and mechanical variable in radiographic technic. Its many automatic compensating devices, constantly in operation, work to the end-result of saving time in handling patients, prolonging tube life and protecting the apparatus from failures due to faulty technic, thus assuring consistently high grade radiographs with resulting film economy.

SPECIAL FEATURES

1. Automatic preselection of milliamperage.
2. Automatic changing of focal spots.
3. Automatic thermal induction regulator.
4. Compensated kilovolt meter (illuminated).
5. Double scale milliampere meter (illuminated).
6. Automatic space charge compensator.
7. Line compensator.
8. Built-in spot change-over device.
9. When doing spot film radiography, both fluoroscopic and radiographic exposures are made with the foot switch. Focal spots are automatically changed to the proper focal spot for the work being done.
10. Fluoroscopic room light control.
11. Overload circuit breaker and main line switch.
12. Separate vernier control of milliamperage for fluoroscopy and therapy.
13. 100 steps of auto-transformer control in 2 KVP steps.
14. Accurate automatic reset timer.
15. Vertical panel gives eye-level view of meters.
16. Five plug receptacle connections are provided for plugging in the various essential accessories. All receptacles are labeled and are of different types, preventing the possibility of plugging into the wrong receptacle. Plug-in connections arranged to accommodate foot switch, spot tunnel, fluoroscopic room light control, Bucky trip cable and therapy timer.

Standard Mobile Control on Film Cabinet

Permits convenient location of controls; increases convenience in operation. Provides storage cabinet for films and cassettes. Lead-lined storage bin with slip-proof lock, mounted on mobile base with ball-bearing casters measures 6" x 16" x 20" (inside).

SPECIAL FEATURES

1. Automatic reset timer, calibrated in 1/20 second, maximum 14 seconds.
2. Milliampere meter has double scale; kilovoltage meter, four scales.
3. Focal selector switch to determine focal spot. Pilot lights show when proper focal spot is in use.
4. Main (line) switch, which functions also as a circuit breaker.
5. Main and auxiliary controls for milliamperage.
6. Main and auxiliary controls for kilovoltage; provides 60 points of adjustment.
7. Pre-adjustment switch. Milliampere pre-settings may be made without energizing the X-ray tube.
8. Timer push button switch.
9. Convenient handles for moving control mechanisms. Receptacles for foot switch and Bucky diaphragm connections are at sides of control mechanism. The position and angle of control panel make for maximum convenience in adjustment and readings. Markings are clear and will remain so permanently.

CONSTRUCTION *Features* OPERATION

DE LUXE CONTROL FEATURES

EQUIPMENT PROTECTION. The main line switch is of the circuit breaker type adjusted to protect the apparatus from short circuits and overloads.

LINE COMPENSATOR. The line compensator permits ready correction for changes in line voltage from day to day or hour to hour. This 10-step switch provides for a 20 volt variation in service line voltage. Adjusting the line compensator switch so that the line voltmeter reads on the red line assures the same definite line voltage at all times. This adjustment guarantees precise operation of the unit and constancy of results under variable service conditions.

AUTOMATIC PRESELECTION OF MILLIAMPERAGE. The automatic milliampere selector switch positively and accurately cuts many electrical and mechanical factors which are normally manual operations. It provides five radiographic milliampere selections, 25, 50, 75 and 100 milliamperes. One very important function of the milliampere selector switch is the automatic selection of the focal spot. This prevents accidental overloading of the fine focus. The FISCHER control never forgets to change focal spots. This automatic switching of focal spots is indicated by the red and green lights on the control panel.

SPACE CHARGE COMPENSATOR. The function of the space charge compensator is to maintain a constant milliamperage regardless of kilovolt settings. Normally, the milliamperes will change with change of kilovolts even though the filament current is maintained at a constant value. The action of the space charge compensator is entirely automatic and requires no attention on the part of the operator.

THERMAL INDUCTION REGULATOR. This is an exclusive FISCHER development. The thermal induction regulator compensates the filament circuit for changes in X-ray tube characteristics due to resistance heating. Used in conjunction with a filament stabilizer (standard equipment), accurate milliampere values are assured regardless of whether the tube is cold or hot. Milliampere values are maintained within 5%.

PRECISE KILOVOLTAGE CONTROL. The De Luxe "RF-100" auto-transformer is a heavy duty type, with more than sufficient capacity to carry the heaviest rated load. Accurate preselection of kilovoltage is obtained throughout the entire voltage range at any milliampere value. The major and minor auto-transformer switches provide 100 selections of kilovoltage at approximately 2 KVP per step. The major switch provides 10 steps of 10 kilovolts each—the minor switch provides 10 steps of 2 kilovolts each.

FLUOROSCOPIC CONTROL. Separate kilovoltage and milliamperage controls are provided for fluoroscopy and therapy. This is particularly advantageous when doing spot radiography. The fluoroscopic filament control is of the vernier type and permits accurate control of milliamperage over a range of 2 to 10 Ma., giving precise control for fluoroscopy or therapy.

TIMER. A motor driven timer with a timing range of 1/10 to 14 seconds is provided. Extremely accurate, it incorporates an automatic reset feature permitting stereoscopic films without resetting the timer. Switching arrangements are provided for automatically tripping the Bucky diaphragm and starting the radiographic exposure.

ACCURATE KILOVOLT METER. A single scale kilovolt meter is provided, instead of the usual multiple scale type, which eliminates the possibility of reading the wrong scale. The meter is compensated to allow for the inherent drop in the high tension transformer which increases as the milliampere load increases. The kilovolt meter reads actual kilovolts at all times, regardless of the milliampere selection, and the same radiographic densities will be obtained at all milliampere values, provided the milliampere second factor is constant.

SPOT FILM CHANGE OVER DEVICE. Ordinarily the spot film change over device is considered extra equipment and is provided at extra cost. In the De Luxe "RF-100" the spot change over device is a built-in feature and is provided as standard equipment. The spot tunnel is extra.

FLUOROSCOPIC ROOM LIGHT CONTROL. A room light control is another built-in feature of the De Luxe "RF-100." No special relays or costly foot switches are required; merely plug into the outlet provided in the control stand.

MOBILE CONTROL FEATURES

Mobile Control on Film Cabinet available as alternate accessory control mechanism (see preceding page).

HIGH TENSION TRANSFORMER

Advanced design and sound engineering principles have been incorporated in the De Luxe "RF-100" high tension transformer. The De Luxe "RF-100" transformer, compact in size, is of the closed-core type. All electrical parts are immersed in oil of sufficient volume to insure efficient cooling. Entire transformer assembly is immersed in insulating oil and is contained in welded steel tank of heavy gauge steel.

TRANSFORMER CAPACITY

Radiography		Fluoroscopy		Therapy	
100 Ma.	96 KVP	5 Ma.	90 KVP	5 Ma.	96 KVP

All capacities shown above represent 85% of the maximum output of the apparatus, 15% being reserved as a safety overload factor.

TABLE FEATURES

TUBE CARRIAGE ARM. A single tube carriage arm supports the X-ray tube and its movements through a supporting sleeve casting on ample ball bearing surfaces, which provides free and easy movement both horizontally and vertically. A trunion type mounting fork is used for securing the X-ray tube unit to the tube carriage arm. This provides a flexible type mounting, allowing the rotation of the X-ray tube 360° around the axis of the arm and 30° each way from the center of the fork mounting, so that any required angle may be secured with ease. Ample locks within easy reach are provided for securing tubestand in all positions, horizontally and vertically.

SHOCKPROOF X-RAY TUBE. A specially constructed heavy duty shockproof high tension X-ray tube is provided, together with shockproof cables of sufficient length to connect the tube with the transformer which is mounted beside the tube stand.

SHOCKPROOF THROUGHOUT. The De Luxe "RF-100" is rendered completely shockproof by means of an oil immersed shockproof double focus tube installed in a grounded metal tube housing. The tube housing is connected with the high tension transformer through high tension cables having a grounded metal sheath. Positive grounding of the entire unit is accomplished through a ground wire incorporated in the line cable.

FLUOROSCOPIC SCREEN AND MOUNTING. A Patterson Type "B-2" fluoroscopic screen, 12" x 16" is provided as regular equipment. The screen automatically centers on the tube in all positions and is supplied with a spring counterbalance for use in the horizontal position. Spring tension can be relieved when the table is used in the vertical position. Locks are provided for locking the screen and tube in any position crosswise or lengthwise of the table. A lock is also furnished for locking the screen rigidly at any desired height from the table top.

BUCKY DIAPHRAGM. The latest model (50 line grid with a ratio of 6 to 1) Bucky diaphragm, fully counterbalanced in all positions of the table, with a timing range of ½ to 30 seconds, is provided as standard equipment. A 1/10 to 30 seconds Bucky diaphragm can be supplied if desired. An interlocking device holds the Bucky and tubestand together so that they move at the same time. Simple movement disengages tubestand when the Bucky is not in use.

FINISH. The De Luxe Model "RF-100" is exceptionally attractive in hammered tone gray with polished chromium trim.

Cat. No.		Code
5100	FISCHER De Luxe Model RF 100 Milliampere Shockproof X-ray Apparatus complete with De Luxe Upright Automatic Control and Timer, Fluoroscope Mounted Tilt Table and Bucky, including essential accessories listed below*	DREAM
5098	FISCHER De Luxe Model RF 100 Milliampere Shockproof X-ray Apparatus complete with Standard Mobile Control on Film Cabinet, Fluoroscope Mounted Tilt Table and Bucky, including essential accessories listed below*	DROLL

*Essential Accessories (Filter 1 MM.; Foot Switch; Combination Seat and Shoulder Rest; Type B Compression Cone; Compression Device with Band)

Operating Voltage: 210-245 Volts; 50-60 Cycles.
Max. Current: 100 Amperes. Power Rating: 15 KVA.
Shipping Weight: Domestic 2850 lbs.; Foreign 3300 lbs.



NEW HOME OF H. G. FISCHER & CO.



De Luxe Model RF 200 Milliampere Shockproof X-ray Apparatus.



De Luxe Model RF 100 Milliampere Shockproof X-ray Apparatus.



Model MP 10 or 20 Milliampere Mobile-Portable Shockproof X-ray Apparatus.



100 Milliampere X-ray Unit with Urological Table.



Table Model "200" Short Wave Diathermy Unit.



De Luxe Model "400" Short Wave Diathermy Unit.

Representative Units of the Complete Line of H. G. FISCHER & CO.

The complete H. G. FISCHER & CO. line includes many models of Shockproof X-ray apparatus (medical and dental), Short Wave Diathermy Units, Galvanic and Contractile Currents Generators, Ultra Violet Generators, Infra Red Generators, other apparatus, supplies and accessories. H. G. FISCHER & CO. has always maintained the policy of meeting or exceeding the standards of any competing units designed for the same purpose, regardless of price, and pricing all apparatus at the lowest point consistent with quality manufacture.

SINCE 1910, H. G. FISCHER & CO. has been one of the largest manufacturers of Shockproof X-ray and Electromedical equipment. Pioneers in the field of X-ray and Electromedical equipment, H. G. FISCHER & CO. is recognized throughout the world today for apparatus of dependable service and great durability. H. G. FISCHER & CO. is the ORIGINAL COMPANY. It has no connection with any other company having a similar name. No H. G. FISCHER & CO. equipment is manufactured outside of the Chicago area.

More than thirty-eight years of experience in engineering, design and construction of X-ray and Electromedical apparatus, together with fine workmanship and materials, are built into all H. G. FISCHER & CO. apparatus. The fact that today over 100,000 physicians, dentists, hospitals, clinics, universities and other medical organizations in the United States and throughout the world use H. G. FISCHER & CO. apparatus reflects its outstanding quality and service.

All H. G. FISCHER & CO. apparatus is serviced and sold through factory-trained representatives who are well qualified to render necessary technical assistance. Our comparatively small overhead expense and factory-trained representation enable us to give purchasers such value per dollar expended as cannot be excelled by any other manufacturer in the field.

The new home of H. G. FISCHER & CO. is now conveniently located at 9451-91 W. Belmont Ave., Franklin Park, Illinois, a western suburb of Chicago (3200 North and 9400 West, by the Chicago numbering system). Doctors are cordially invited to visit the new H. G. FISCHER & CO. plant, where modern X-ray and Electromedical equipment will be displayed and demonstrated. A visit entails no obligation.

H. G. FISCHER & CO.

9451-91 W. BELMONT AVE. • FRANKLIN PARK, ILLINOIS

1948 Form 2113

Printed in U.S.A.



Model TF 30 or 50 Milliampere Shockproof Fluoroscope with Radiographic Facilities.



Model TC 30 or 50 Milliampere Shockproof X-ray Apparatus.



Model "SWDX" Wall Mounted Shockproof Dental X-ray.



Model "CMDX" Mobile Shockproof Dental X-ray.



Model "J" Galvanic and Contractile Currents Generator.



Model "DK" Ultra Violet Generator.

The DeLuxe RF-100 X-Ray Apparatus may be had with Hand Tilted Table or Motor Driven Table. It may be had with:

1. One stationary anode tube only
2. Two stationary anode tubes
3. One rotating anode tube only
4. One stationary anode tube and one rotating anode tube

X-RAY
H.G.
FISCHER
& CO.
FRANKLIN PARK, ILL. U.S.A.
VALUE - DEPENDABILITY

"SPACESAVER"

Radiographic-Fluoroscopic Unit
and Examining Table
100 or 250 Milliamperes



HORIZONTAL RADIOGRAPHY

Any part of a patient's body can easily be radiographed in the horizontal position. The examining table is 26¼ inches wide and 73 inches long including foot rest — capable of accommodating any patient. The tubehead travels up and down and across the cabinet, giving a complete range of operation. Either a standard Bucky diaphragm or a stationary grid may be used.

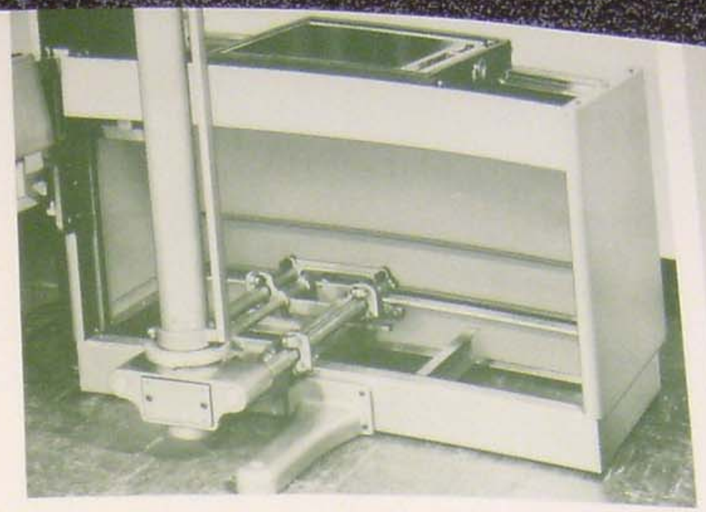
H. G. FISCHER & CO.

9451-91 W. BELMONT AVE. • FRANKLIN PARK, ILLINOIS
(Suburb of Chicago)

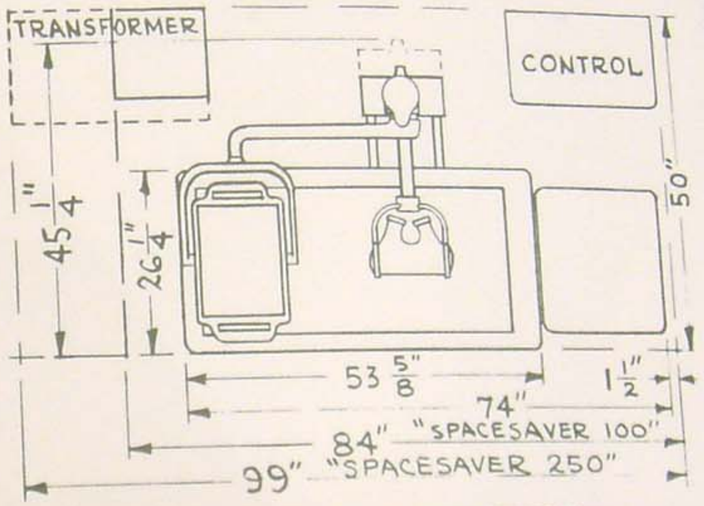


VERTICAL FLUOROSCOPY

The table top is raised and locked in the vertical position, forming a thoroughly adequate vertical fluoroscopic panel for the patient to lean against. The tubehead is then rotated on its horizontal axis 90° from the radiographic position. The 12-by-16-inch fluorescent screen is automatically centered with the tubehead. The fluoroscopic shutters are attached to the tubehead so that at all times, in either the horizontal or vertical position, maximum protection is assured.



The rigid, sturdy, channel construction details are shown in this rear view of the FISCHER "Spacesaver".



Floor plan view with dimensions of the FISCHER "Spacesaver", 100 Ma or 250 Ma. Scale ½ inch = 1 foot.

Cat. No.	DESCRIPTION	Code
5188	FISCHER "Spacesaver 250" with De Luxe Automatic Control, 1/20 second Automatic Reset Timer and Foot Switch	HOCOH
5186	FISCHER "Spacesaver 100" with De Luxe Automatic Control, 1/10 second Automatic Reset Timer and Foot Switch	HELMS
5187	FISCHER "Spacesaver 100" with Standard Mobile Control, 1/10 second Motor-driven Synchronous Timer and Foot Switch	HEXAR
	Following are suggested accessories not included in above prices.	
5172	20-line grid 14" x 17" ½ second 30" focal distance Bucky with magnetic release, x-ray timing contacts, rollers and Bucky connecting cord	HAGUS TIPPS
4736	Cone	HAINE
5175	Stirrups	HAITT
5176	Pad for Table Top	HADAN
5177	30" focal distance stationary aligned grid—size 14"x17"	HADAT
5178	Moveable support and tray for cassette and stationary grid	



The table top is compound hinged at one end and can easily be raised to the vertical position, where it automatically locks.

VERTICAL RADIOGRAPHY

The tubehead is turned and focused on a patient standing against a wall-mounted cassette holder at the correct distance. Vertical radiographs can be made at either end or either side of the table.





VERTICAL FLUOROSCOPY

The table top is raised and locked in the vertical position, forming a thoroughly adequate vertical fluoroscopic panel for the patient to lean against. The tubehead is then rotated on its horizontal axis 90° from the radiographic position. The 12-by-16-inch fluorescent screen is automatically centered with the tubehead. The fluoroscopic shutters are attached to the tubehead so that at all times, in either the horizontal or vertical position, maximum protection is assured.

FISCHER "Spacesaver"

Radiographic-Fluoroscopic Unit and Examining Table, 100 Ma or 250 Ma

Both horizontal and vertical radiography and fluoroscopy.
Minimum floor space.
Minimum operating effort.
Absolute safety for operator and patient.

The FISCHER "Spacesaver" Combination Radiographic-Fluoroscopic Unit and Examining Table is the newest development in the FISCHER complete line of modern, shockproof x-ray equipment. This great line is distinguished for outstanding performance and exceptional durability. As its name implies, the "Spacesaver" is the most compact of all x-ray apparatus of such power and versatility. It was designed to occupy a minimum amount of floor space and to give dependable performance with the least effort on the part of the operator. It may be used as an every day examining table.

The great breadth of its uses is as amazing as the ease with which it functions. It can be switched from positions for horizontal fluoroscopic work to positions for horizontal radiographic work, and vice-versa, by a simple swing of the tubehead. The change to vertical fluoroscopic and vertical radiographic positions is equally as easily accomplished.

A Patterson Type B-2 (full size 12" x 16") fluoroscopic screen is included with the FISCHER "Spacesaver" at no additional cost. The size and quality of the FISCHER "Spacesaver" fluoroscopic screen satisfy the need of specialists. The shutter controls are on screen staging convenient for the operator.

"Spacesaver 100" capacity is 100 Ma at 90 KVP, 75 Ma at 95 KVP, 50 Ma at 95 KVP, 25 Ma at 96 KVP, 10 Ma at 96 KVP, and 5 Ma at 96 KVP.

"Spacesaver 250" capacity is 250 Ma at 90 KVP, 200 Ma at 100 KVP, 100 Ma at 100 KVP, 10 Ma at 120 KVP, intermittent, and 7 Ma at 120 KVP, continuous.

Finish is attractive, lasting, hammered gray.

DE LUXE AUTOMATIC CONTROL

The FISCHER De Luxe Automatic Control mechanism incorporates many exclusive features which make radiography a simple, precise science. There is no guesswork when using the FISCHER "Spacesaver". It eliminates as far as humanly possible every electrical and mechanical variable in radiographic technic. Its many automatic compensating devices, constantly in operation, work to the end-result of saving time in handling patients, prolonging tube life and protecting the apparatus from failures due to faulty technic, thus ensuring consistently high quality radiographs with resulting film economy.

SPECIAL FEATURES, DE LUXE AUTOMATIC CONTROL

1. Automatic pre-selection of milliamperage.
2. Automatic changing of focal spots.
3. Compensated kilovolt meter (illuminated).
4. Double scale milliampere meter (illuminated).
5. Automatic space charge compensator.
6. Line compensator.
7. Built-in spot change-over control.
8. When dating spot film radiography, both fluoroscopic and radiographic exposures are made with the foot switch. Focal spots are automatically changed to the proper focal spot for the work being done.
9. Fluoroscopic room light control.
10. Overload circuit breaker and main line switch.
11. Separate vernier control of milliamperage for fluoroscopy and therapy.
12. 166 steps of auto-transformer control in 2 KVP steps.
13. Accurate automatic reset timer, calibrated in 1/25 sec. for 250 Ma "Spacesaver" and 1/10 sec. for 100 Ma "Spacesaver", maximum 14 seconds.
14. Vertical panel gives eye-level view of meters.
15. Five plug receptacle connections are provided for plugging in the various essential accessories. All receptacles are keyed, preventing the possibility of plugging into the wrong receptacle. Plug-in connections arranged to accommodate foot switch, spot tunnel, fluoroscopic room light control, Bucky trip cable and therapy timer.

STANDARD CONTROL

The FISCHER Standard Control permits convenient location of controls and increases convenience in operation.

SPECIAL FEATURES

1. Motor-driven synchronous timer, calibrated in 1/10 second, maximum 14 seconds.
2. Milliampere meter has double scale; kilovoltage meter, four scales.
3. Focal selector switch to determine focal spot. Pilot light shows when proper focal spot is in use.
4. Main (line) switch, which functions also as a circuit breaker.
5. Main and auxiliary controls for milliamperage.
6. Main and auxiliary controls for kilovoltage; provides 60 points of adjustment.
7. Pre-adjustment switch. Milliampere pre-settings may be made without energizing the X-ray tube.
8. Timer push button switch.
9. Receptacles for foot switch and Bucky diaphragm connections. The position and angle of control panel make for maximum convenience in adjustment and readings. Markings are clear and will remain so permanently.



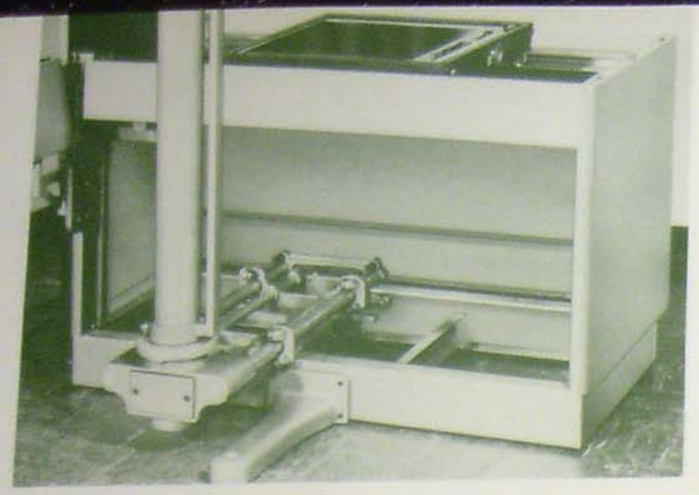


HORIZONTAL FLUOROSCOPY

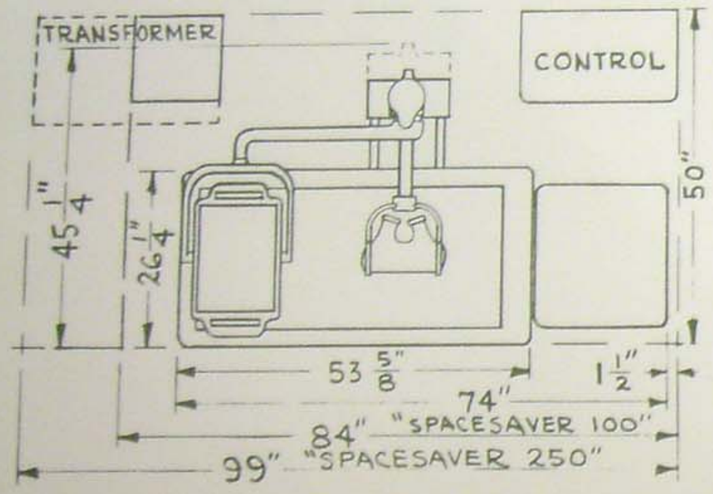
The changing from the horizontal radiographic to the horizontal fluoroscopic position, or the reverse, is made without moving patient from table. This feature is especially advantageous when, for example, after setting a hookup home with the aid of the fluoroscope, it is desired to radiograph the results for permanent records. The fluoroscopic field is 48 inches long and may be utilized in its entirety.

FISCHER & CO.





The rigid, sturdy, channel construction details are shown in this rear view of the FISCHER "Spacesaver".



Floor plan view with dimensions of the FISCHER "Spacesaver", 100 Ma or 250 Ma. Scale ½ inch = 1 foot.

Cat. No.	DESCRIPTION	Code
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5187	FISCHER "Spacesaver 100" with Standard Mobile Control, 1/10 second Motor-driven Synchronous Timer and Foot Switch	HEXAR
Following are suggested accessories not included in above prices.		
5172	20-line grid 14" x 17" ½ second 30" focal distance Bucky with magnetic release, x-ray timing contacts, rollers and Bucky connecting cord	HAGUS
4736	Cone	TIPPS
5175	Stirrups	HAINE
5176	Pad for Table Top	HAITT
5177	30" focal distance stationary aligned grid—size 14"x17"	HADAN
5178	Moveable support and tray for cassette and stationary grid	HADAT

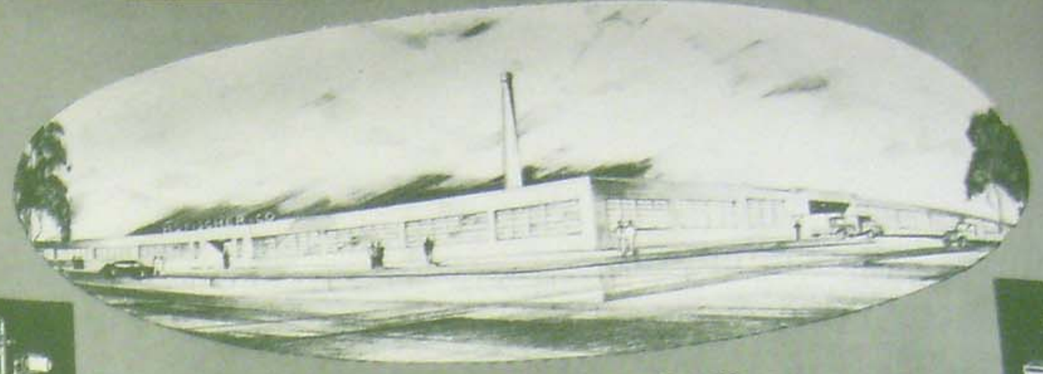


The table top is compound hinged at one end and can easily be raised to the vertical position, where it automatically locks.

VERTICAL RADIOGRAPHY

The tubehead is turned and focused on a patient standing against a wall-mounted cassette holder at the correct distance. Vertical radiographs can be made at either end or either side of the table.





NEW HOME OF H. G. FISCHER & CO.



De Luxe Model "RF" 250 Milliampere X-ray Apparatus with Hand-Rocked or Motor-Driven Table.



De Luxe Model "RF" 100 Milliampere X-ray Apparatus with Hand-Rocked or Motor-Driven Table.



Model "MPA" 30 or 20 Milliampere Mobile-Portable Shockproof X-ray Apparatus.



100 Milliampere X-ray Unit with Universal Table.



Table Model "250" Short Wave Diathermy Unit.



De Luxe Model "400" Short Wave Diathermy Unit.

United States Navy

BUREAU OF MEDICINE AND SURGERY

Certificate of Achievement

to

H. G. Fischer & Co.

In grateful acknowledgment of exceptional cooperation and outstanding services rendered to the Medical Department of the Navy during the period of World War II



"Spacesaver" 30 Milliampere Shockproof X-ray Apparatus with Stationary Table.



Model "TC" 30 or 20 Milliampere Shockproof X-ray Apparatus.



Model "TF" 30 or 20 Milliampere Shockproof Fluoroscope with Radiographic Facilities.



Model "CHOX" Mobile Shockproof Portable X-ray.



Model "T" Shockproof Portable Geriatric



Model "CX" Portable Geriatric

ARMY E NAVY

H. G. FISCHER & CO.

FRANKLIN PARK, ILLINOIS

Manufacturers of high quality X-ray and electromedical equipment since 1910.

Holders of the U. S. Army-Navy "E" Award with three additional awards represented by the stars on the flag, and holders of the U. S. Navy Certificate of Achievement — all for outstanding services rendered.

This series of awards constitutes the most signal recognition granted any manufacturer of x-ray equipment.

Producing — in a new 82,000 sq. ft. factory — efficient, durable, attractive apparatus, which offers customers the greatest value per dollar expended obtainable in the entire industry.



Adm. H. Deering, Surg. General, U. S. Navy, presenting Certificate of Achievement to A. W. Jacobs, President, H. G. Fischer & Co. Official U. S. Navy photograph.

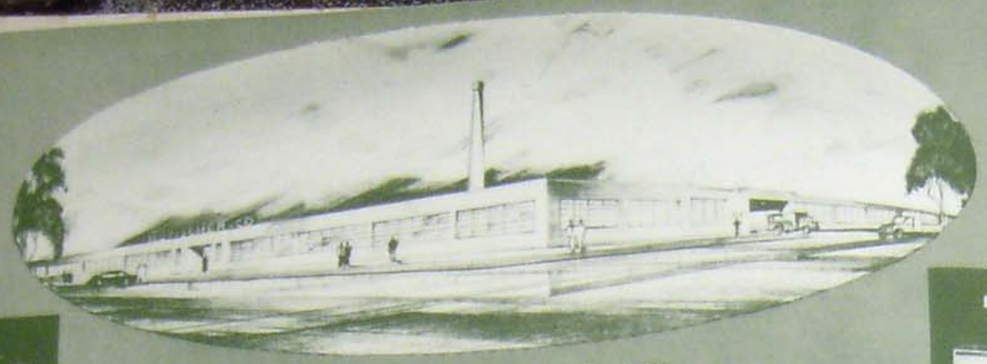
OVER 100,000 SATISFIED USERS THROUGHOUT THE WORLD

H. G. FISCHER & CO.

9451-91 W. BELMONT AVE. • FRANKLIN PARK, ILLINOIS

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NEW HOME OF H. G. FISCHER & CO



De Luxe Model "BF" 100 Milliampere X-ray Apparatus with Hand-Rocked or Motor-Driven Table.



De Luxe Model "BF" 100 Milliampere X-ray Apparatus with Hand-Rocked or Motor-Driven Table.



Model "MPA" 30 or 50 Milliampere Mobile Portable Shockproof X-ray Apparatus.



100 Milliampere X-ray Unit with Urological Table.



Table Model "200" Short Wave Diathermy Unit.



De Luxe Model "400" Short Wave Diathermy Unit.



"Spacesaver" 30 Milliampere Shockproof X-ray Apparatus and Examining Table.



Model "TC" 30 or 50 Milliampere Shockproof X-ray Apparatus.



Model "TF" 30 or 50 Milliampere Shockproof Fluoroscope with Radiographic Facilities.



Model "CMDX" Mobile Shockproof Dental X-ray.



Model "I" Galvanic and Contractile Currents Generator.



Model "CK" Ultra-Violet Generator.

United States Navy

BUREAU OF MEDICINE AND SURGERY

Certificate of Achievement

to

H. G. Fischer & Co.

In grateful acknowledgment of exceptional cooperation and outstanding services rendered to the Medical Department of the Navy during the period of World War II

Rear Admiral, MC, U.S.N.
Surgeon General of the Navy

ARMY E NAVY

H. G. FISCHER & CO.
FRANKLIN PARK, ILLINOIS

Manufacturers of high quality X-ray and electromedical equipment since 1910.

Holders of the U. S. Army-Navy "E" Award with three additional awards represented by the stars on the flag, and holders of the U. S. Navy Certificate of Achievement — all for outstanding services rendered.

This series of awards constitutes the most signal recognition granted any manufacturer of x-ray equipment.

Producing — in a new 82,000 sq. ft. factory — efficient, durable, attractive apparatus, which offers customers the greatest value per dollar expended obtainable in the entire industry.



A. H. Dearing, Rear Admiral, MC, U. S. Navy, presenting Certificate of Achievement to A. W. Mathis, President, H. G. Fischer & Co. Official U. S. Navy photograph.

OVER 100,000 SATISFIED USERS THROUGHOUT THE WORLD

H. G. FISCHER & CO.

9451-91 W. BELMONT AVE. • FRANKLIN PARK, ILLINOIS

1249 Form 3130

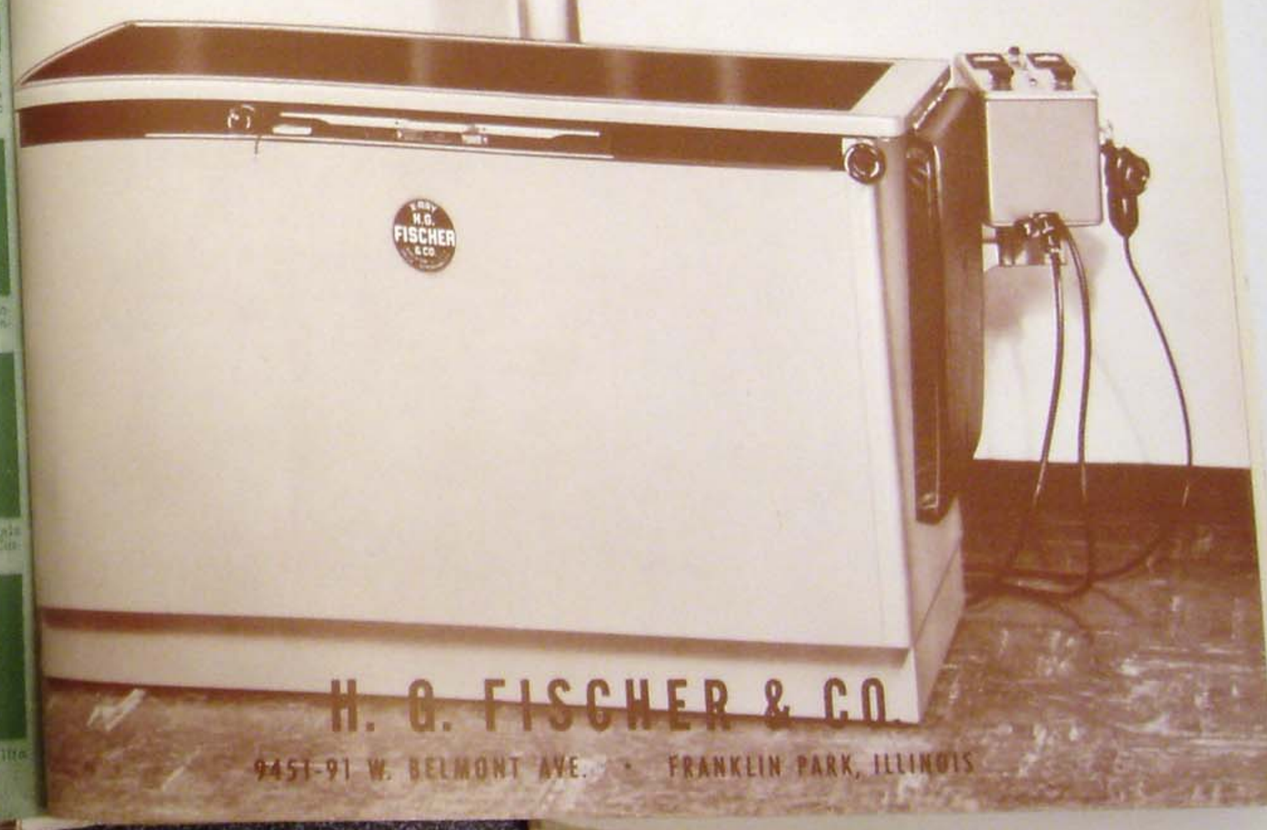
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X-RAY H.G. FISCHER & CO. FRANKLIN PARK, ILL. U.S.A. VALUE + DEPENDABILITY

"SPACESAVER 30"

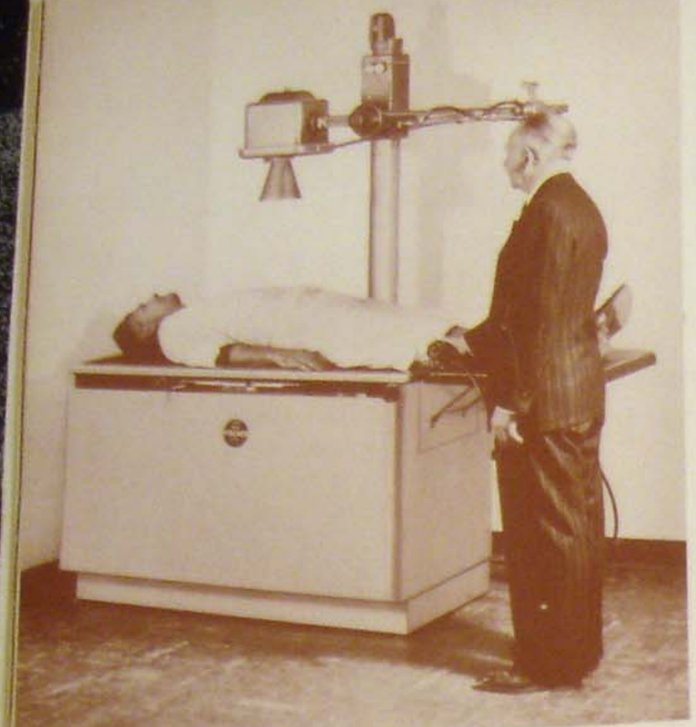


Radiographic-Fluoroscopic Unit and Examining Table

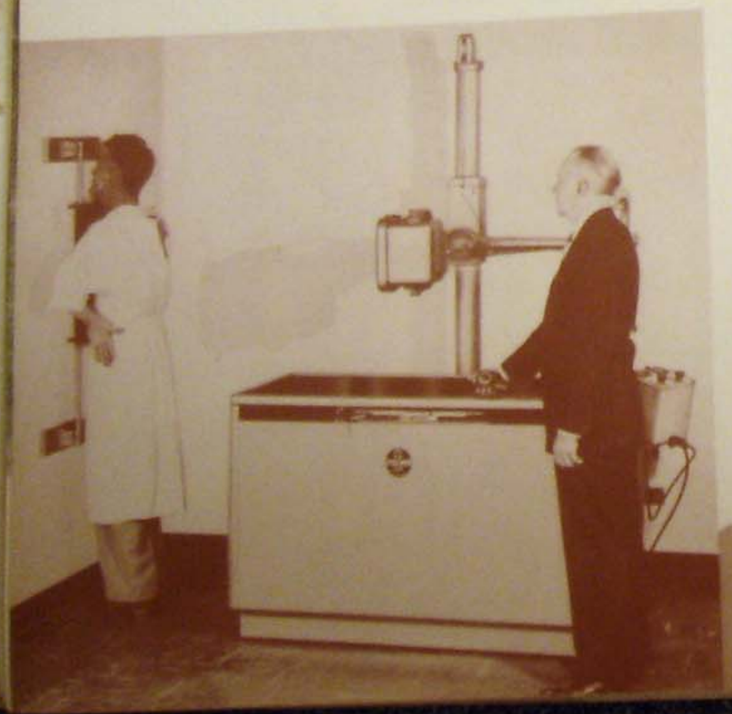


H. G. FISCHER & CO.

9451-91 W. BELMONT AVE. • FRANKLIN PARK, ILLINOIS



HORIZONTAL RADIOGRAPHY—Any part of a patient's body can easily be radiographed in the horizontal position. The examining table is 28¼ inches wide and 73 inches long — capable of accommodating any patient. The tubehead travels up and down and across the cabinet, giving a complete range of operation. Either a standard Bucky diaphragm or a stationary grid may be used. The Bucky or grid tray is on a continuous track running the entire length of the cabinet, and the Bucky is mounted on ball bearing rollers.



VERTICAL RADIOGRAPHY—The tubehead is turned and aligned at a perfect standing upright a wall-mounted cassette holder at the correct distance. Vertical radiographs can be made at either end or either side of the table.

FISCHER "Spacesaver 30"

Low in Price

High in Quality

Greatest Value per Dollar Expended

Proven Dependability

RADIOGRAPHIC-FLUOROSCOPIC UNIT AND EXAMINING TABLE

The FISCHER "Spacesaver 30" Combination Radiographic-Fluoroscopic Unit and Examining Table is an outstanding development in the FISCHER complete line of modern, shockproof x-ray equipment. This great line is distinguished for exceptional performance and great durability. The "Spacesaver 30" is the most compact of all x-ray apparatus of such power and versatility. It was designed to occupy a minimum amount of floor space and to give dependable performance with the least effort on the part of the operator. It may be used as an every day examining table as well as an x-ray apparatus. In approximately the same space required for an ordinary examining table you can, in the case of the "Spacesaver 30," have not only an examining table but also a complete x-ray plant.

IDEAL FOR GENERAL PRACTITIONER

The FISCHER "Spacesaver 30" is ideal for the general practitioner. The great range of its uses is as amazing as the ease with which it functions. It can be switched from positions for horizontal fluoroscopic work to positions for horizontal radiographic work, and vice-versa, by a simple swing of the tubehead. The change to vertical fluoroscopic and vertical radiographic positions is equally as easily accomplished.

121 KILOVOLTAGE REGULATIONS

The control is compactly mounted on the cabinet. It has 121 steps of kilovoltage regulations, making possible the universally recognized, valuable, thickness-of-part technic for most accurate radiographic end results. A control with this large number of steps of kilovoltage regulation is rarely found in other than the most expensive equipment. This is another Extra Value feature offered in the FISCHER "Spacesaver 30."

The control is so constructed that when the Bucky diaphragm is used the timing of the x-ray exposure is done by the x-ray timer and not by the less accurate timing mechanism incorporated in all Bucky diaphragms.

CONSTRUCTION *Features* OPERATION

MECHANICAL

PATIENT NOT DISTURBED when changing from horizontal fluoroscopy to horizontal radiography. Tubehead is easily swung out from under table, raised and swung to radiographic position over table.

TABLE doubles as every-day examining table and x-ray table. Top is compound hinged and raises easily to function as vertical fluoroscopic panel. Stirrups are available for use on the examining table. Table dimensions are 26¼" wide and 73" long.

TUBEHEAD travels up and down and across the cabinet giving complete range of operation. It has a cross travel shift feature for making stereoscopic views. Housing is leakproof seamless drawn steel. Swinging arm supporting tubehead and fluoroscopic screen is counterbalanced and automatically locks in fluoroscopic and radiographic positions.

VERTICAL TUBE COLUMN for tubehead rotates 360°. Carriage cross members are solid steel bars to eliminate sagging. Eccentric bearings used where necessary to permit adjustment to eliminate play.

FULL-SIZE FLUOROSCOPIC SCREEN, 12" x 16" Patterson Type B-2, has ¼" lead glass protection. Shutter controls are on the screen staging. Screen automatically centers with tubehead in fluoroscopic position.

STANDARD BUCKY DIAPHRAGM size 14" x 17", may be used. Bucky is mounted on ball bearings and travels full length of cabinet. Stationary grid may also be used. Bucky or grid tray can be moved out of fluoroscopic field under observation.

CABINET is of rigid, sturdy, channel construction. "Spacesaver 30" control can be mounted on the front or on the back of the cabinet. "Spacesaver 250", "Spacesaver 100", and "Spacesaver 50" all have remote control. Leveling devices permit exact leveling of entire unit.

ELECTRICAL

HIGH OUTPUT on adequate lines: "Spacesaver 30" capacity is 30 MA at 74 KVP, 25 MA at 80 KVP, 20 MA at 85 KVP, 5 MA at 96 KVP—all useful kilovoltages.

WALL OUTLET ADEQUATE for operation of "Spacesaver 30" on average office lighting circuit up to 20 MA at 85 KVP. It operates on 110V or 220V, 50-60 cycles.

121-STEP CONTROL of kilovoltage regulation permits the universally used thickness-of-part technic for most accurate radiographic end results. Changes of less than two kilovolts each are possible. This is an Extra Value feature at no additional cost.

EXACT KILOVOLTS register on accurate meter for all milliampere values.

HEAVY-DUTY CONTACTOR breaks transformer primary current.

TRANSFORMER CORE construction makes it possible to reduce size of tubehead with increased efficiency.

ACCURATE TIMER, ¼ second to 12 seconds, with built-in contacts automatically trips Bucky and times exposure. The x-ray timer is much more reliable than the less accurate Bucky timing mechanism.

FOOT SWITCH actuates heavy-duty contactor. Neon light on foot switch to facilitate locating it in dark room while making fluoroscopic examinations.

PLUG CONNECTIONS on control for plugging in foot switch, timer and x-ray head inter-connecting cable.

VOLTAGE TAPS on control permit operation of unit on 110V, 120V, 220V, or 240V, 50-60 cycle lines.

X-RAY PROTECTION at tubehead in accordance with standards adopted by International Radium and X-ray Commission and is equivalent to 1.5 mm of lead.

3 EXPANSION CHAMBERS to allow for oil expansion.

PILOT LIGHT indicates when control is energized.

Doctor

May we ask you to CONSIDER

1. How an X-ray would increase your services to your patients.
2. What a great convenience it would be to them and to you.
3. How safe, compact, durable and easily operated today's models are.
4. How an X-ray produces a substantial income.
5. How little cash outlay is required to install X-ray equipment which almost always is more than a self-liquidating investment.

Cat. No.	DESCRIPTION	Code
5188	FISCHER "Spacesaver 250" with DeLuxe Automatic Control, 1/20 second Automatic Reset Timer and Foot Switch	HOCOH
5186	FISCHER "Spacesaver 100" with DeLuxe Automatic Control, 1/10 second Automatic Reset Timer and Foot Switch	HELMS
5187	FISCHER "Spacesaver 100" with Standard Mobile Control, 1/10 second Automatic Reset Timer and Foot Switch	HEXAR
5185	FISCHER "Spacesaver 50," including remote control on mobile stand, synchrotimer and foot switch	HAPAN
5166	FISCHER "Spacesaver 30" with Foot Switch	HADDY
Following are suggested accessories		
5172	20-line grid 14" x 17" ½ second 30" focal distance Bucky with magnetic release, x-ray timing contacts, rollers and Bucky connecting cord	RAGUS
408H	Timer and Cable for "Spacesaver 30"	TASER
4736	Cone	TIPPS
5175	Stirrups	HAINE
5176	Pad for Table Top	HAITT
5177	30" focal distance stationary aligned grid — size 14" x 17"	HADAN
5178	Moveable support and tray for cassette and stationary grid	HADAT

Prices subject to change without notice. F.O.B. Franklin Park, Ill.



HORIZONTAL RADIOGRAPHY—This view of a patient's knee was made by removing the Bucky diaphragm, and centering the tube to the film. The diaphragm is then replaced, and the Bucky is moved to the position shown above. The Bucky is held up by the counter-balance weight at the cabinet, and the Bucky is mounted on ball bearing rollers.



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"Spacesaver 30"

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SPECIAL FEATURES

Both horizontal and vertical radiography and fluoroscopy.

Minimum floor space.

Minimum operating effort.

Standard Bucky diaphragm travels full length of cabinet.

Power sufficient for all radiographic and fluoroscopic work usually encountered in general practice.

Voltage factor sufficient for superficial therapy.

Absolute safety for operator and patient.

Quickly designed by skilled FISCHER x-ray engineers with over 38 years experience.

Built by FISCHER expert craftsmen, using the finest materials and methods for great dependability and durability.

PLUGS IN OFFICE WALL OUTLET

It will be found that excellent radiographic and fluoroscopic results will be obtained from the "Spacesaver 30" when operating from only the usual office wall plug outlet of 110 volts, 50-60 cycles. This type of line, while not always adequate for the maximum radiographic output of which the machine is capable, will suffice for by far the greater portion of usual radiographic requirements and serve for maximum efficiency in fluoroscopy.

In order to obtain the maximum milliamperage and kilovoltage factors of which the machine is capable it may be necessary in some locations, due to an inadequate line, to install heavier wiring for these factors. This will not be necessary in the majority of installations for the reason that for fluoroscopy the maximum efficiency of the machine may be obtained on all lines and a line sufficient for only 30 milliamperes will be found adequate for excellent radiographic results. Provisions are made in the control unit to operate on either 110 or 220 volt 50-60 cycle current.

STANDARD 14" x 17" BUCKY CAN BE USED

In the knowledge that the use of a Bucky diaphragm is so universally preferred—in fact demanded — by most physicians skilled in x-ray work, the FISCHER "Spacesaver" was designed to make possible the most efficient use of a standard Bucky diaphragm to its full and normal extent. We believe that no similar equipment of other manufacture has this advantage to anything like the same degree.

When it is preferred to serve the relatively



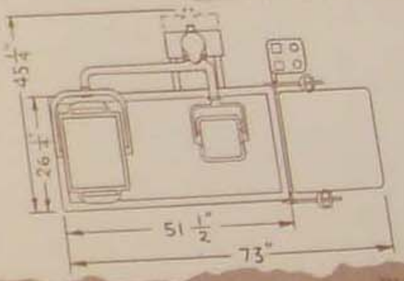
HORIZONTAL FLUOROSCOPY—The shooting from the horizontal radiographic to the horizontal fluoroscopic position is the reverse in method, without moving patient from table. The tubestem is especially adjustable, for example, after setting a broken femur with the aid of the fluoroscope, it is designed to radiograph the results for permanent records. The fluoroscopic field is 48 inches long and may be utilized in its entirety by merely moving the Bucky to and fro at the centralized zone under examination.





The table top is horizontal hinged at one end and may be raised to the vertical position, where it automatically locks.







Spacesaver 30" Combination Radiographic-Fluoroscopic Unit, with vertical tubestem.

MENT



"Spacesaver 30" with Wall Control Transformer and De Luxe Kilovoltage Control. Control supplied with "Spacesaver 30" is mounted on cabinet.



The control may be mounted on the front of the cabinet, as shown above, or on the back of the cabinet, as shown at left.



CONSTRUCTION *Features* OPERATION

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Cat. No.	DESCRIPTION	Code
5088	FISCHER "Spacesaver 250" with DeLuxe Automatic Control, 1/20 second Automatic Reset Timer and Foot Switch	SOCOR
5086	FISCHER "Spacesaver 100" with DeLuxe Automatic Control, 1/10 second Automatic Reset Timer and Foot Switch	SELMI
5087	FISCHER "Spacesaver 100" with Standard Mobile Control, 1/10 second Automatic Reset Timer and Foot Switch	HEXAR
5085	FISCHER "Spacesaver 50," including remote control on mobile stand, synchrotimer and foot switch	HAPAN
5086	FISCHER "Spacesaver 30" with Foot Switch	HADDY
Following are suggested accessories		
5173	20-line grid 14" x 17" ½ second 30" focal distance Bucky with magnetic release, x-ray timing, contacts, rollers and Bucky connecting cord	HAGUS
4088	Timer and Cable for "Spacesaver 30"	TASER
4736	Cone	TOPPS
5175	Stirrups	HAINE
5176	Pad for Table Top	HAZIT
5177	30" focal distance stationary crossed grid — size 14" x 17"	HADAN
5178	Moveable support and tray for cassette and stationary grid	HADAT

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Doctor

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ARMY E ** NAVY

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1149 Form 5128A

RECOMMENDED DARK ROOM AND RADIOGRAPHIC ACCESSORIES REQUIRED FOR GENERAL RADIOGRAPHY

THIS LIST CAN BE USED WHEN A QUICK SUMMARY IS REQUIRED

DARK ROOM ACCESSORIES

Cat. No.	Amount	Description		Unit Price	Total Price
1927	1	Model A 3-Compartment 5 Gal. Buckite Developing Tank	each	$55.00	$55.00
1717	2	Developing Hangers 8" x 10"	"	2.10	4.20
1714	2	Developing Hangers 14" x 17"	"	2.25	4.50
3296	1	Floating Thermometer	"	2.00	2.00
4730	1	14" x 17" Cassette equipped with--	"	21.45	21.45
2871	1	Pair 14" x 17" High Speed Screens	pair	45.20	45.20
4727	1	8" x 10" Cassette equipped with--	each	14.85	14.85
2862	1	Pair 8" x 10" High Speed Screens	pair	15.20	15.20
1680	2	Cardboard Exposure Holders	each	.55	1.10
3064	1	5 Gal. Bottle Concentrated Developer (Liquid)	each	4.50	4.50
3065	1	1 Gal. Bottle Concentrated Replenisher (Liquid)	"	1.25	1.25
3066	1	5 Gal. Bottle Concentrated Fixer (Liquid)	"	4.50	4.50
4765	1	Kodak Adjustable Dark Room Lamp	"	7.58	7.58
4165	1	10-Watt Bulb for above (bulb not incl.)	"	.25	.25
4837	1	Model S Minuteminder Dark Room Timer	"	6.50	6.50
3093	1	Pkg. of 25 - 8 x 10 Films	"	6.10	6.10
3096	1	Pkg. of 25 - 14 x 17 Films	"	17.50	17.50
4847A	1	Film Storage Chest (For Cassettes and Films)	"	32.00	32.00

RADIOGRAPHIC ACCESSORIES

4695	1	Film Marker with Name and Case	each	7.50	7.50
4364	1	Thickness Caliper	"	2.50	2.50
4786	1	Fischer Wall Mounted Cassette holder	"	73.00	73.00
3786	1	14 x 17 Illuminator (Fluorescent)	"	25.00	25.00

NOTE - One Type B (6") Cone is supplied as standard equipment on the Deluxe 250, Deluxe 100 - all T units - MPA-20 and the MPA-30 and will not have to be included in orders for above units. When ordering any of the above units the following cones should be ordered in addition to the Type B cone furnished as standard equipment.

4736	1	Type C Cone (4")	each	8.50	
4735	1	Type D Cone ($2\frac{1}{2}$")	"	6.50	

When ordering a Spacesaver 30, Spacesaver 50, Spacesaver 100 or TF Unit INCLUDE THE FOLLOWING CONES:

Cat. No.	Amount	Description		Unit Price	Total Price
4737	1	Type B Cone (6")	each	$ 9.50	
4736	1	Type C Cone (4")	"	8.50	
4735	1	Type D Cone (2½")	"	6.50	

NOTE - On all Spacesaver 50 Units include the Type J Cone listed below. In addition the Types B, C, and D Cones are recommended.

5174	1	Type J Cone (10")	each	14.00	

NOTE - Above cones required Cat. No. 4742 adaptor if used on TF Units (see optional selection list attached for price and catalog number)

TOTAL PRICE LESS CONES $359.78

NOTE - If Fluoroscopy is contemplated the following fluoroscopic accessories should be included:

385A	1	Lead Rubber Apron	each	$15.00	$15.00
4053	1	Pair Lead Rubber Gloves	pair	15.50	15.50
4842	1	Pair Fluoroscopic Goggles for Eye Accommodation	pair	2.75	2.75

TOTAL FLUOROSCOPIC ACCESSORIES $33.00

REQUIRED FOR GENERAL RADIOGRAPHY WITH MINIMUM REQUIREMENTS RECOMMENDED

DARK ROOM

Cat. No.	Description		Unit Price	Minimum Quantities Recommended
1927	Model A 3-Compartment 5 Gal. Developing Tank (Buckite)		$55.00	
	OR			
2908	Wolf 3-Compartment 5 Gal. Developing Tank		60.00	
	OR			1
2909	Model B 3-Compartment 2½ Gal. Developing Tank (Buckite)		44.00	
	OR			
2760	Wolf 3-Compartment 2½ Gal. Developing Tank		50.00	
1717	Developing Hangers 8" x 10"	each	2.10	2
1714	Developing Hangers 14" x 17"	"	2.25	2
3296	Floating Thermometer	"	2.00	1
4730	14" x 17" Cassette equipped with	"	21.45	1
2871	Pair 14" x 17" High Speed Screens	pair	45.20	1
4727	8" x 10" Cassette equipped with	each	14.85	1
2862	Pair 8" x 10" High Speed Screens	pair	15.20	1
1680	Cardboard Exposure Holders	each	.55	2

CHEMICALS REQUIRED FOR 5 GAL. DEVELOPING TANKS

3064	5 Gal. Bottle Concentrated Developer (Liquid)	each	4.50	1
3065	1 Gal. Bottle Concentrated Replenisher (Liquid)	each	1.25	1
3066	5 Gal. Bottle Concentrated Fixer (Liquid)	"	4.50	1
	OR			
685	5 Gal. Pkg. Powdered Developer	each	3.50	1
681	1 Gal. Pkg. Powdered Replenisher	"	1.00	1
708	5 Gal. Can Powdered Fixer	"	3.25	1

CHEMICALS REQUIRED FOR 2½ GAL. DEVELOPING TANK

681	1 Gal. Pkg. Powdered Developer	each	.85	3
707	1 Gal. Pkg. Powdered Fixer	"	.75	3

Cat. No.	Description		Unit Price	Minimum Quantities Recommended
5167	Fluoroscopic Foot Switch for use with T Units	each	$18.00	1
4930	Fluoroscopic Foot Switch for use with MPA 20	"	30.00	1
5189	Fluoroscopic Foot Switch for use with MPA 30	"	16.50	1
4695	Film Marker with name, lead figures and case (Neon lighted)	"	7.50	1

X-RAY ACCESSORIES

CASSETTE HOLDERS

	LIST PRICE
Fischer Wall-Mounted Tilting Cassette Holder	$ 70.00
Fischer Wall-Mounted Cassette Holder	73.00

HAND FLUOROSCOPES

5" x 7" Patterson Shielded Hand Fluoroscope	$ 66.00
5" x 7" Patterson Shielded Operating Fluoroscope	79.00
5" x 7" Fischer Hand Fluoroscope	42.00

PATTERSON TYPE "B2" FLUOROSCOPIC SCREENS

5" x 7" Screen	$ 14.00
8" x 10" Screen	32.00
10" x 12" Screen	48.50
11" x 14" Screen	61.50
12" x 16" Screen	77.50
14" x 17" Screen	95.50

STATIONARY FILTER GRIDS

Parallel Lead Strips Grids

5" x 7"	$ 35.00
8" x 10"	60.00
10" x 12"	80.00
11" x 14"	95.00
14" x 17"	122.50

36-Inch Focal Distance Aligned Grids

10" x 12"	$ 95.00
11" x 14"	110.00
14" x 17"	137.50

30-Inch Focal Distance Aligned Grids

10" x 12"	$ 95.00
11" x 14"	110.00
14" x 17"	137.50

DEVELOPING TANKS

14" x 36" Powell Non-refrigerated Five Gallon Capacity Without Cover.	$133.00
Stainless Steel Cover for Above Tank	12.50
14" x 17" Powell Non-refrigerated Five Gallon Capacity Without Cover.	79.50
Stainless Steel Cover for Above Tank	8.25
14" x 17" Powell Refrigerated Five Gallon Capacity Including Stainless Steel Cover	435.00
14" x 17" Powell Five Gallon Capacity Improved Non-refrigerated Tank Without Cover	110.00
Stainless Steel Cover for Above Tank	11.75
Powell Dryer for Films Up to and Including 14" x 17" With Cover	295.00
14" x 17" Powell Water Cooled Five Gallon Capacity Refrigerated Tank Including Cover	467.50
14" x 17" Wolf Five Gallon Capacity Tank	60.00
8" x 10" Wolf One Gallon Capacity Tank	35.00
14" x 17" Wolf Two-and-One-Half Gallon Tank	50.00

DEVELOPING TANKS (CONT'D)

5" x 7" Wolf One-Half Gallon Capacity tank	$ 15.00
Kaye Self-Contained Refrigerated Five Gallon Capacity Tank	485.00
Buck Five Gallon Capacity Tank	55.00
Buck Two-and-One-Half Gallon Capacity Tank	44.00
Buck Dental Tank One Gallon Capacity	28.50
Buck Dental Tank With Overflow Stand Pipe	36.20

"HAIRPIN" PORTABLE IMMERSION HEATER ..... $ 13.50

THERMOMETERS

Combination Thermometer and Stirring Device	$ 1.85
Floating Thermometer	2.00

FILM STORAGE CABINETS

All Metal Film Chest 8 1/8" x 19 5/8" x 19" Hammered Grey Finish	$ 32.00
All Steel 14" x 36" Cabinet With Cover Hammered Grey Finish	80.00

ILLUMINATORS

Fischer Powell 14" x 36" Illuminator	$ 55.00
Buck 14" x 17" Illuminator	19.80
Buck Fluorotube 14" x 17" Illuminator	32.50
Fischer 14" x 36" Illuminator	75.00
Paragon Economy Illuminator 14" x 17"	15.00
Paragon Dental Illuminator	8.00

INTENSIFYING SCREENS

Buck X-TRA Speed and Buck MID Speed Screens

5" x 7"	$ 3.20 - Pair	11" x 14"	$ 21.00 -Pair
6½" x 8½"	6.50 - Pair	14" x 17"	32.00 -Pair
8" x 10"	10.50 - Pair	14" x 36"	67.50 -Pair
10" x 12"	16.00 - Pair		

Eastman Ultra Speed Screens

5" x 7"	$ 6.50 - Pair	11" x 14"	$ 28.40 -Pair
6½" x 8½"	11.60 - Pair	14" x 17"	44.00 -Pair
8" x 10"	14.80 - Pair	14" x 36"	93.10 -Pair
10" x 12"	22.20 - Pair		

Patterson High Speed Screens

5" x 7"	$ 6.60 - Pair	11" x 14"	$ 29.30 -Pair
6½" x 8½"	12.00 - Pair	14" x 17"	45.20 -Pair
8" x 10"	15.20 - Pair	14" x 36"	95.80 -Pair
10" x 12"	22.80 - Pair		

Patterson Par Speed Screens

5" x 7"	$ 5.90 - Pair	11" x 14"	$ 25.85 -Pair
6½" x 8½"	10.50 - Pair	14" x 17"	39.90 -Pair
8" x 10"	13.45 - Pair	14" x 36"	84.65 -Pair
10" x 12"	20.15 - Pair		

CASSETTES

Buck Stainless Steel Bakelite Front

5" x 7"	$ 11.00	11" x 14"	$ 19.25
6½" x 8½"	13.20	14" x 17"	21.45
8" x 10"	14.85	14" x 36"	49.50
10" x 12"	17.05		

X-RAY FILMS

Ansco Non-Screen Films and Kodak Non-Screen Films

	25 SHEET PKG.	75 SHEET PKG.
5" x 7"	$ 3.45	$ 10.05
6½" x 8½"	5.25	15.30
8" x 10"	7.35	21.40
10" x 12"	10.80	31.45
11" x 14"	13.80	40.15
14" x 17"	21.10	61.40

ANSCO High Speed, BUCK Safety Base and KODAK Blue Brand X-Ray Films

	25 SHEET PKG.	75 SHEET PKG.
5" x 7"	$ 2.85	$ 8.35
6½" x 8½"	4.35	12.70
8" x 10"	6.10	17.75
10" x 12"	8.95	26.10
11" x 14"	11.45	33.30
14" x 17"	17.50	50.95
14" x 36"	36.60	Not Stocked

KODAK X-RAY FILM CORNER CUTTER ..... $ 11.00

X-RAY EXPOSURE HOLDERS

Kodak 5" x 7"	$ .40	Kodak 10" x 12"	$ .65
Kodak 6½" x 8½"	.55	Kodak 11" x 14"	.80
Kodak 8" x 10"	.55	Kodak 14" x 17"	.95

NEGATIVE PRESERVERS (FILING ENVELOPES)

Manila Filing Envelopes

5" x 7"	$ 1.40 per 100	10" x 12"	$ 2.65 per 100
6½" x 8½"	1.80 per 100	11" x 14"	3.00 per 100
8" x 10"	1.80 per 100	14" x 17"	3.80 per 100

DEVELOPING HANGERS

Fischer 14"x36" Fold Over Developing Hanger for Use in 14"x17" 5 Gallon Tank	$ 7.50
Powell 14" x 36" Hanger	8.00
Fischer 5" x 7" Hanger	2.00
Fischer 6½" x 8½" Hanger	2.10
Fischer 8" x 10" Hanger	2.10
Fischer 10" x 12" Hanger	2.15
Fischer 11" x 14" Hanger	2.20
Fischer 14" x 17" Hanger	2.25

FILM DRYING RACK

Paragon Drying Rack	$ 2.50

DEVELOPER

Powder Form

Kodak and Buck X-Ray Developer Sufficient to Prepare 1 Gallon Solution	$ .85
Kodak and Buck X-Ray Developer Sufficient to Prepare 5 Gallon Solution	3.50

Concentrated (Liquid) Form

Kodak and Buck X-Ray Developer Sufficient to Prepare 1 Gallon Solution	$ 1.25
Ansco Developer Sufficient to Prepare 1 Gallon Solution	1.25
Kodak, Buck and Ansco X-Ray Developer Sufficient to Prepare 5 Gallon Solution	4.50

FIXER

Powder Form

Buck Fixer Sufficient to Prepare 1 Gallon Solution	$ .85
Kodak Fixer Sufficient to Prepare 1 Gallon Solution	.85
Buck Fixer Sufficient to Prepare 5 Gallon Solution	3.00
Kodak Fixer Sufficient to Prepare 5 Gallon Solution	3.25

Concentrated (Liquid) Form

Kodak, Buck and Ansco Fixers Sufficient to Prepare 1 Gallon Solution	$ 1.25
Kodak, Buck and Ansco Fixers Sufficient to Prepare 5 Gallon Solution	4.50

THICKNESS-OF-PART CALIPER

Fischer Thickness-Of-Part Caliper	$ 2.50

X-RAY FILM FILING CABINETS

Fischer - Bentson

	Olive Green or Grey	Walnut or Mahogany
Three Large Drawers with Small Temporary Flat Filing Drawer At Top	$ 96.50	$ 113.00
Same with General Lock	108.00	124.50
Three Drawer Cabinet Without Temporary Drawer	89.00	103.25
Same with General Lock	100.50	114.75
Two Drawer Cabinet With Small Temporary Flat Filing Drawer at Top	80.50	94.25
Same with General Lock	92.00	105.75
Two Drawer Cabinet Without Temporary Drawer	73.25	84.75
Same with General Lock	84.75	96.25

X-RAY FILM FILING CABINETS (CONT'D)

Fischer - Bentson

	Olive Green or Grey	Walnut or Mahogany
Single Drawer Cabinet	$ 40.00	$ 48.50
Same with Individual Lock	44.25	52.75

DARK ROOM LAMPS

Kodak Lamp with 5½" Safelight	$ 4.67
Kodak Adjustable Lamp with 5½" Safelight	7.58
Brownie Lamp with Rectangular and Circular Safelight	3.79
Buck Lamp 8" x 10" Fitted with Safelight	16.80

GASTROPAQUE

20 Dose Package (Flavored)	$ 2.25
10 Pound Package (Flavored)	2.50
10 Pound Package (Unflavored)	2.00

GALL BLADDER OPAQUE

Paragon Gall Bladder Opaque Single Bottle	$ .90
Paragon Gall Bladder Opaque One Dozen Bottles	4.60

BARIUM MEAL

5 Pound Can	$ 1.50
10 Pound Can	2.50
25 Pound Can	5.75
100 Pound Can	20.00

NEO-IOPAX

20 cc. Ampule	$ 2.00

TETRADOL EMULSION

Single Dose	$ 1.25
One Dozen Doses	9.70

DIODRAST

20 cc. Ampules, Ready for Use	$ 1.75
20 cc. Ampules, Box of Ten	15.35

LEADED RUBBER GLOVETS

Lead Rubber Glovets Pair	$ 14.00
Left Hand Glovet Only	8.40

LEATHER-COVERED LEADED RUBBER X-RAY PROTECTION GLOVES

Medium Size	$ 15.50

X-RAY APRONS

Waterproof Apron	$ 2.50
Leaded Rubber Apron	15.00

TIMERS

Hawkeye Measured Timer - Spring Wound	$ 9.50
Model "S" Minute Minder - 60 Minute Range	6.50

X-RAY FILM MARKERS

Perfection Marker with Four Sets of 1/4" Figures and One Each R and L In Wood Case	$ 7.00
Set of Months and Dates	3.75
Perfection Marker Only	2.75
Eclipse Cushion Film Marker Including: 1 Marker with Name and Address..... 4 Each 1/4" Figures 0 to 9 Mounted 1 Each 1/4" Letters R and L Mounted 1 Eighteen Compartment Case.....	$ 7.50
1 Months and Dates Set	$ 2.50
Figures Mounted	Each .06
Marker Only Stenciled	3.00
Ideal Cushion Marker Including: 1 Marker Stenciled..... 4 Each 3/16" Figures 0 to 9 Mounted 1 Each 3/16" Letters R and L Mounted 2 Each 3/16" Letters A to Z Mounted 1 Each 3/16" Letters A-E-I-O-U..... 1 36 Compartment Case.....	$ 11.50
1 Months and Dates Set	$ 3.75
1 Months and Dates Set In Figures Only	2.50
1 Marker Only Stenciled	3.25
Figures or letters Mounted	.06
Wheel Marker with Month and Date Attachment: Marker with Month and Date Attachment	$ 10.00
Attachment only	3.00
Marker Only	7.00
Lead Letters and Figures for Above Markers: Mounted	.06
Unmounted	Each .04

X-RAY GLASSES

Paragon Fluoroscopic Goggles With Green Lense Only	$ 2.75
Paragon Protective Fluoroscopic Goggles With Lead Glass and Dark Olive Green Lenses.	6.50
Paragon Fluoroscopic Glasses	3.50
Paragon (Non-Protective) Fluoroscopic Goggles - Red or Green	2.50





A. H. Dearing, Rear Admiral, MC, U. S. Navy, presenting Certificate of Achievement to A. W. Mathis, President, H. G. Fischer & Co. *(Official U. S. Navy photograph.)*

ARMY E NAVY

H. G. FISCHER & CO.

FRANKLIN PARK, ILLINOIS

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Model "CK" Ultra Violet Generator.

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ELECTRO-THERAPEUTICS

WITH THE

MORSE WAVE GENERATOR

ELECTRO-THERAPEUTICS

WITH THE

MORSE WAVE GENERATOR

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Boston, Mass.

ELECTRO-THERAPEUTICS

BY THE

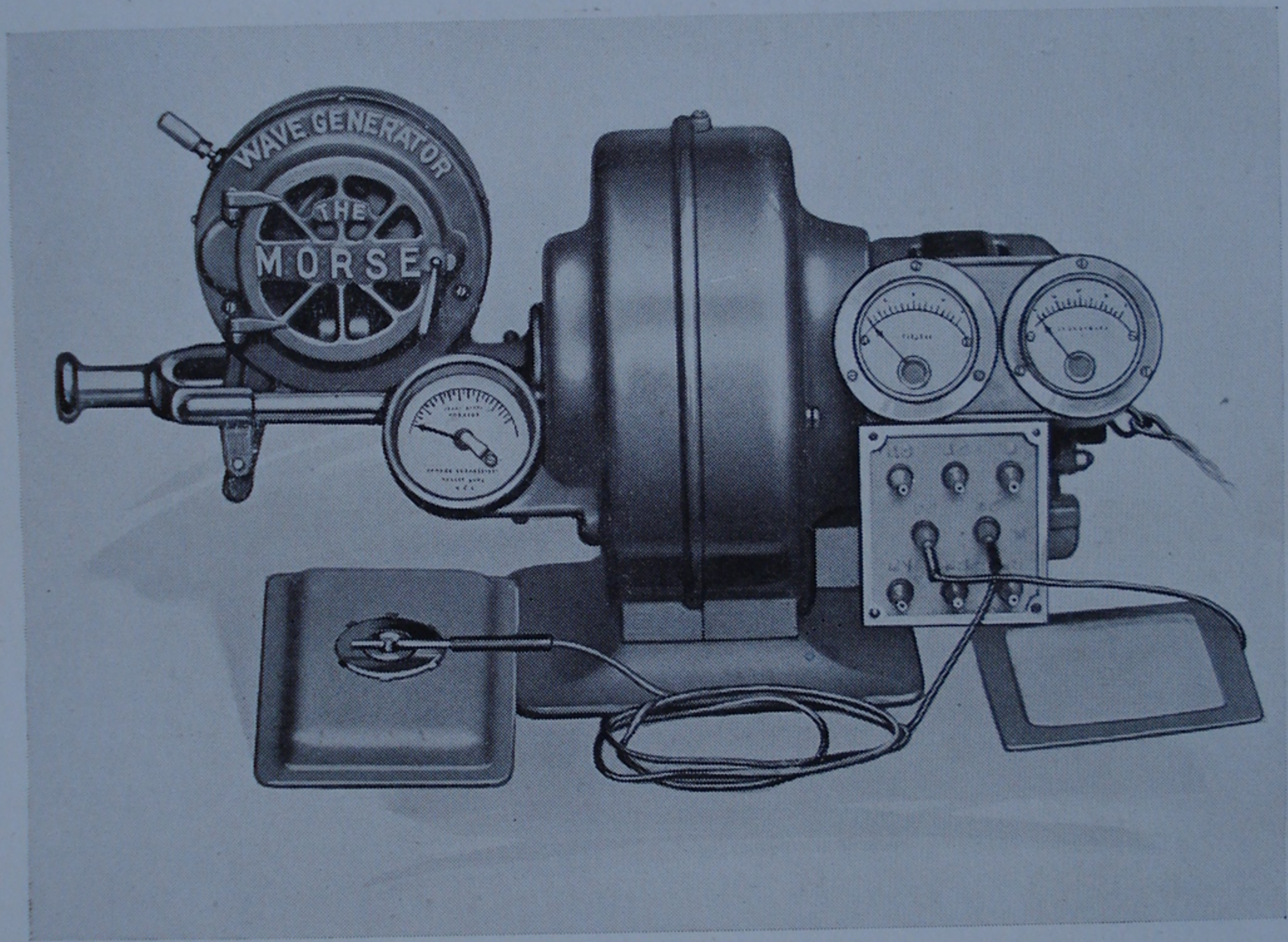
MORSE WAVE GENERATOR

BY

FREDERICK H. MORSE, M. D.

(University of City of New York, 1881)

President of the American Electro-Therapeutic Association in 1900, President of The New England Electro-Therapeutic Association 1906-1907, Lecturer on Electro-Therapeutics at Tufts College Medical School, 1907-1908, U. S. Delegate to International Congress of Physio-Therapy at Rome 1907 and Paris 1910.



THE MORSE WAVE GENERATOR

ELECTRO-THERAPY

WITH THE

MORSE WAVE GENERATOR

THE MORSE WAVE GENERATOR

FOREWORD

It is not necessary for a Physician or Surgeon to be an electrician, but he should know something more about electricity than that the signs + and — stand for the positive and negative poles respectively, before he treats his patient with the continuous current. In the following pages an attempt has been made to give, necessarily briefly and dogmatically, sufficient information for the intelligent use of the alternating and continuous, or galvanic current, in disease. This book is intended for those only, who have neither time nor inclination to study larger works on the subject.

These instructions are given for the guidance of those who are unfamiliar with the technique of wave-current therapy and the many phases in the use of the galvanic current, and who further have had no didactic or positive instruction in the use of the application of electricity in treatment of disease, and are apt to hesitate as to methods and dosage, and their adaption to each individual case. The physician who has become an apt technician will have no need of reiteration of the basic principles and modalities of the subject, and will use such original methods and modifications as personal experience or tact may devise.

With a new Therapeutic Method having distinct and prominent special features, an explanation of principal and technique of application, is essential.

PREFACE

The purpose of this book is two-fold. First, to outline briefly as possible well-known facts and accepted theories of the physical and chemical action, on human tissue, of electrical and mechanical therapeutics methods. Second, to establish a systematic basis for application which, being scientific and rational, must meet the commendation of the profession. I hope to make the instructions sufficiently clear, so that the method of relieving Stasis and restoring function will be better understood.

The object is to impress upon the busy practitioner of medicine, perhaps more than upon the Specialist, the importance of caring for the human body, in health and disease, as a kind of mechanism, rather than a complicated mass of protoplasm, in which every perversion of normal function must be met with drugs, or other symptomatic treatment. In addition the author's principle purpose is to impress on the profession the importance of imitating Nature, as nearly as possible, in restoring normal cell activity, by definite physical therapeutics, rather than by Sedatives, Cathartics, etc.

It seems to the general practitioner of medicine, who has been dependent wholly upon his pharmaceutical allies, and with whose methods he has been satisfied, to be illogical and presumptuous, to step aside from the beaten path and to use methods which he has heretofore considered irregular, and used only as weapons of a Charlatan, for making money.

To a physician attempting to obtain definite therapeutic results through rythmic mechanical or electrical measures, it would seem a radical change from his former dependencies, as drugs and surgical instruments. Any physician who will familiarize himself with modern teaching of natural and physiological measures, in his effort to restrain abnormal vital action, has made a great stride in his efficiency as a medical man.

It is not the purpose of this book — which is intended only as a therapeutic guide — to write history, theorize, or express private opinion, but only to aid the profession in becoming better acquainted with the laws of electro-physics and the physiology pertaining to the subject.

For more than two hundred years the use of electricity, and physical therapeutics generally, has passed through many vicissitudes. As each fresh important discovery in the science

has been reached, much interest has been aroused anew in the subject, and its therapeutic properties and wonderful possibilities have been extended throughout the medical world. These discoveries, with extravagant promises of cure, were followed by some successes but by more failures and disappointments, causing them to be discarded, and after a time revived brought to public attention as some new modality.

The following pages are not intended as a guide covering the whole field of physical and electrical therapeutics, for those and other modalities of intrinsic value are in a distinct class by themselves, each of which would require a volume to properly present the subject.

The alternating current, except for high frequency and its still more valuable congenor, the X-Ray, has been used only commercially.

The advent of the Morse Wave Generator upon the field of therapeutic action has, to a certain extent, along with manifold features of the direct current, with its variations of voltage and amperage, revolutionized physical and electrical treatment of disease.

That there may be no misinterpretation of the theoretical and practical consideration herein set forth, it may be well to advise the reader of the importance of recognizing the significance of amperage and voltage. As applied in therapeutics, high amperage means chemical action; high voltage, penetration. Upon proper adjustment of these essentials depends the result of electrical application.

DIRECT CURRENT

It is regretable and to a certain extent lamentable that the many thousand users of electricity in medicine — who have a fairly good conception of the use of vibration, spinal manipulation,— and the significance of spinal nerve supply to the various viscera, and a general idea of the application of high-frequency and static currents — are woefully deficient of even elementary knowledge of the galvanic current. This is not because they are not willing and anxious to obtain such information, but because modern text books on the subject are wanting, and instrument dealers have not exerted themselves in that direction, therefore, little has been written on the well-known physical laws of the constant current.

It is an established fact that the current passes from the

positive to the negative pole, and it influences the fluids of the body in the direction of the current. The physiological action of this current passing through living tissue is to elevate the temperature of the section through which it passes. Where a metal contact is made upon the skin of healthy living tissue, a burning sensation takes place at either pole, but it is much more distinct and irritating at the negative, or exit of the current. If a sufficiently strong current be used when two metal pointed electrodes are applied to a portion of the body, at the positive pole there will be a contraction of the skin at the point of contact, and if sufficient amount of current be used, a burn will take place, which will leave a scar, hard and dry in character and more or less bleached, caused by dimished blood supply. At the negative pole, with the same strength of current, the parts will become red and congested, due to the increased blood supply, and if the current be made sufficiently strong, a burn will ensue, as at the positive pole, but totally different in character, which would be soft, spongy and yielding, leaving a scar difficult to heal.

At the positive pole is an increasing accumulation of oxygen and acids. At the negative, alkalis and hydrogen. It is absolutely essential, for one using the galvanic current, to be familiar with the above described chemical action, that mistakes may not occur. Having obtained the knowledge of just what can be done chemically and physiologically and using neither too much temerity nor undue timidity, the physician has at hand a two edged weapon which gives a wider range of usefulness as far as local applications are concerned in the treatment of disease, than all other methods combined.

From the processes resulting from the action of the direct current, in its passage through animal tissues, we have in electrotherapeutics the names Electrolysis and Phoresis, (anaphoresis and cataphoresis.) We are perhaps, too much accustomed to think of both these phenomena, chemical decomposition and mechanical transference of molecules or atoms, (electrolysis and Phoresis) as terminal effects of the current; that is, as taking place only in those tissues in the immediate vicinity of the electrodes.

It is true, that by reason of concentration or density of the current at the points where the electrodes are applied, the effect there is greatest; but it must be understood that the same action, only in less degree, is occurring all along the path through the tissues over which the current travels.

Muscular fibre deprived of its nerve supply fails to react under any Faradic stimulation. It reacts only to galvanic stimulation, and the progressive decrease in galvano-muscular irritability indicates accurately the stage of muscular degeneration. In paralysis, a disease of the motor cells of the cord, we find at first, though only for a brief period, a distinct increase of irritability. From the fact that this increase of irritability develops slowly, it is evident that it is due to a progressive degeneration of the nerve endings rather than loss of nerve impulses. If the muscular fibres preserve their transverse striation, as indicated by their reaction to galvanic stimulation, there is hope of ultimate recovery, or at least of improvement; but when their reaction progressively grows less and is finally lost, the transverse striation has been replaced by granular and fatty degeneration, and no treatment can hope to be of service.

In examining the muscles of children, it is of the utmost importance to eliminate, as far as possible, all pain and even discomfort. We should make our examinations as agreeable as possible, for the best interests of the patient.

The rapid interruptions, which make up what is termed alternating and Faradic currents, do not affect the muscular fibre, but only the more sensitive nerve structure. They give no time for a distinct muscular contraction which becomes tonic rather than clonic.

Definite or measurable therapeutics, by means of applications of electricity of physical measures to the human body, is rarely attempted or accomplished except by the use of the direct, or commonly called, Galvanic current. A current of electricity flowing from the positive to the negative pole causes well-known chemical and physiological action, not only within the medium, which is in the circuit, but at the entrance and exit of the current. These absolute and certain actions on live tissues are neither theories nor opinions of the author, but facts. With a knowledge of the true significance of the terms, Amperage, Voltage, and Resistance, one can do definite therapeutic work, as in no other way.

The same amount of current using a large voltage (175 to 200) would produce a deeper action with much less or almost no skin disturbance, when surface electrodes are used.

This variation of current penetration is all important in the use of the galvanic current when the ailment is far from the surface, and the usual galvanic applications are too often prohibited

because of the burning (skin resistance) sensation. The therapeutics of this is described further on.

Physicians have, to a certain extent, become familiar with the medical value of Sine Wave apparatus, Faradic and Static currents, but a distinct measured wave on the alternating current and a measured wave uni-directional direct current are entirely new features.

The fact that a uni-directional measured wave surging current can be used, selecting the desired Cam for the muscle impulse required, gives a decided advantage over the well-known sinusoidal current, reversing the polarity. In the former case a normal action may be maintained and in the latter, exhaustion and fatigue are apt to follow.

Many attempts have been made to imitate the physiological muscle action by mechanical application of electrodes, the impulses being timed by the watch to a certain number of them per minute. But never before has a mechanical automatic form of apparatus been placed before the profession that can be depended upon to do precisely, as far as physiological action is desired, what is demanded of it.

The majority of functional disturbancee are overcome without help from any source, especially in young people, but when Nature fails to eliminate in a reasonable time the cause of the affliction, whether it is retained intestinal toxemia, or naso-pharyngeal infection, in nerve or joint tissue, something definite and local must be done at once, or a chronic, infiltration, thickening, or some unpleasant pathology, hard to eliminate, will follow.

Instead of describing and illustrating every disease or condition in connection with which the Generator may be used with benefit, the author has endeavored to convince the reader of the importance of knowing what the apparatus will do mechanically, and also of knowing the essentials of the action of the direct current together with the demonstrations, so that even a novice in electro-therapeutics can work intelligently.

Since no two conditions requiring treatment present exactly the same phases, sound judgment and common sense must necessarily be used, as in any other branch of medicine, after the fundamental principles are understood.

The use of the Faradic Current, once so properly and universally used, the mechanical vibrator, and many other forms of mechanical gymnastic exercises of the Zander type, have fallen into disuse. No doubt they had their points of excellence over

other methods in their times, but the world moves and science and invention with it.

The static machine with its valuable qualities for elimination of non-purulent infection, and its wide range of therapeutic indications is being used less and less, because the adoption of the high-frequency and other modern forms of electrical apparatus to a large extent, takes its place. Not since the discovery of the galvanometer, an instrument for measuring the galvanic current, so that an accurate dosage is made attainable, has anything been placed before the medical profession like the Morse Wave Generator, which has so brought the alternating current under control, that definite measured applications are in keeping with physiological teaching.

Dr. William Benham Snow of New York has written many excellent and comprehensive books on the indications for the use of physical and electrical modalities, which the reader will do well to read. His writings are full of valuable suggestions along this line as shown by the following quotations:—

1st. "Chronicity with degeneration and structual change, which must be taken into consideration in determining the prognosis in every case, is the bete-noir of therapeutics."

"The laws which govern the action of the great number of modalities, electrical, thermal, mechanical, nutritional and actinic, are capable of a scientific and definite determination along rational lines. The consideration of these questions from on empirical point of view is no longer deserving of the attention of scientific minds, for positive physical agents give uniformly positive therapeutic results when similarly applied in like cases, indicating the possibility of establishing definite laws of action and indication."

"Disease arises from, or is associated in almost all cases, with an inflammatory process, infected or non-infected. Inflammatory processes present characteristic conditions varying slightly according to the character of the cause."

2nd. "Functional torpor presents conditions of relaxation and softening of tissue, with weakening of the muscular force and general loss of circulatory and nervous tone arising usually from the atony of inactivity or paralysis of the part effected."

3rd. "Degenerating conditions of the different structures call for altered activities to stop the process."

4th. "Conditions secondary to other processes usually of inflammatory origin with impared secretion and other inactive functions."

5th. "Contractures or conditions of muscular spasm are associated usually with an impairment of the nerve centres, of the nerve trunk, or with inflammatory process in the joints involving the skeletal as well as other muscles of the body. The indications in all cases demand first the relief of the process of congestion or other irritation and coincidently treatment of the spasmodic condition present."

The Morse Wave Generator was designed for the special purpose of carrying out definite muscle and nerve action, which, as we physicians thoroughly understand, is so all important in restoring normal cell activity. The arms as used in rowing a boat from twenty-two to twenty-four strokes a minute, with an equal period of contraction and relaxation, illustrates the above theory of normal physiological action; likewise one walking at an ordinary gait, of about seventy steps a minute, the movement of all the muscles involved in the act of respiration, eighteen to twenty-two times a minute, and the peristaltic action of the stomach and colon, about eleven times a minute, give a fair illustration of well-known conditions as they actually occur.

To synchronize the above named muscles which principal can be applied all over the body in a form of mechanism that is automatic and painless, is an achievement that has unquestionably advanced physical therapeutics more than any other thing in this generation.

To be proficient in the use of any form of apparatus in medical practice, one must necessarily become familiar with the technique of application. Also one should recognize the indications for exercise and massage as may apply to the use of the alternating current. If the description of the physiological and chemical action, with brief directions for applications of the galvanic current is not thoroughly understood, then additional information should be sought from text books on the subject.

Muscle Action—That the muscles of the body are the immediate source of energy by which its own parts are moved at will, as well as other things, is so obvious that it is not necessary to elaborate along that line. About seventy-five pairs of the two hundred muscles in the body are used to maintain the general posture and movements of the body. Others are of

special shape, size and length to meet the various indications of the local area of work intended for their special use. When any muscle, or set of muscles, fails to respond to the nerve impulses, which is its guide for action, it is because of some faulty function of the nerve itself, or impairment in the muscle involved.

That the whole digestive tract is a series of hollow muscular fibres, varying in strength and rapidity of action, is well understood. An impaired area of the aforesaid involuntary muscles not only cause local disturbance, but also throws out of balance continguous or remote visceral structures, which causes functions dependent upon it to become disarranged.

Muscles that are used naturally have more tone than those less active, and whatever retards the normal process sooner or later must be overcome that the part may not become impaired.

An attempt to restore normal muscular vigor unless done with reference to the existing pathology is certainly working in the dark. We are instructed in our physiological teachings that certain well-known parts of the body have definite muscular action; if through injury or disease muscular ability is impaired and an attempt is made to restore function by any electrical or physical means, and the process thus instituted be much more rapid than is normal for the individual part, then fatigue and exhaustion may follow. If on the other hand, the process to regain lost ability be much slower than normal, metabolism fails to assert itself.

Many forms of mechanical apparatus have been devised in this country and Europe, especially Sweden, to attempt to synchronize normal muscle impulse, and to a certain extent have succeeded. The apparatus, however, has usually been cumbersome, and, so far as the author has been able to ascertain, is devoid of the essential to make it a success, namely, localization of application, so that deep or superficial invigoration may be obtained in measured form.

ALTERNATING CURRENT

Alternating currents of electricity as distributed from the street lighting circuit, while available for lighting and power, cannot be used for therapeutical purposes. The process of reducing, by means of transformers, make it practical for the physician's use.

It is a principle of well-known physical laws that penetration, through liquid or solid bodies, by heat, light, sound and

electricity, depends upon their wave lengths. The shorter the wave lengths, the deeper the penetration, and the principle applies in therapeutics by application on the human body of electricity, vibration, X-Ray, etc., with the single exception of the direct current.

The transformer is, in principle, identical with the physician's induction coil, commonly called Faradic, consisting of a primary and secondary coil wound over an iron core. The current in the primary induces distinct and second current impulses in the secondary coils. In the ordinary induction coil the low-pressure large-amperage current in the primary, induces a high-pressure small-amperage current in the secondary. In the reducing transformer the high-pressure small-amperage current in the primary induces a low-pressure large-amperage current in the secondary for the customer. When this process of transforming is carried on sufficiently so that voltage and amperage be reduced to the point of safety for medical purposes, then the foundation for a therapeutic practice is established.

When one or two coils of wire constituted as described for commercial purposes with its primary and secondary arrangement is made to revolve or pass to and fro in close proximity to the terminals of an electric magnet, there is set up in that coil a secondary induction, which, when connected with the proper wire terminals, so that it may be applied to the human body, produces an effect, which is strictly speaking an alternating current. The more rapidly it is revolved or passed to and fro near the magnet, the shorter the alternations are in the current that is produced, the pleasanter the sensation and deeper the penetration in effect. When two coils and two magnets are arranged in the same manner and the same process instituted, other things being equal, the lines of force will be cut in half, or, in other words, be half as long in alternations. Six permanent magnets and twelve coils, like the above described, charged with a direct current of electricity, one remaining stationary, the other revolving in close proximity, will set up exactly the same kind of induction, as above described, only the lines of magnetic force will be cut six times twelve or seventy-two times faster, as compared with one coil and one magnet, and with this increased rapidity of alternations the skin is less disturbed.

To carry this principle still further, the twelve coils of the Morse Wave Generator opposing twelve powerful, permanent, steel magnets, the armature revolving at a high rate of speed still further accentuates the principle. The enormous rapidity

of the alternation thus produced makes the identity of the usual sine wave impulse destroyed and thus a fine thrilling sensation is produced. The introduction of the cam principle in the circuit establishes a new definite and measured physical and electrical addition to the physicians armamentarium which will be appreciated more and more as familiarity with its efficiency is understood.

A current which periodically flows in the opposite direction and in both directions for the same length of time, and whose variations in strength when flowing in either direction take place in the same manner are equal in amount. When the current has passed from zero to a maximum value in one direction, then again to zero and on to the same maximum value in the opposite direction, and again to zero, it is said to have completed a cycle. The number of cycles passed through in one second is termed the frequency of the current.

Fig. A

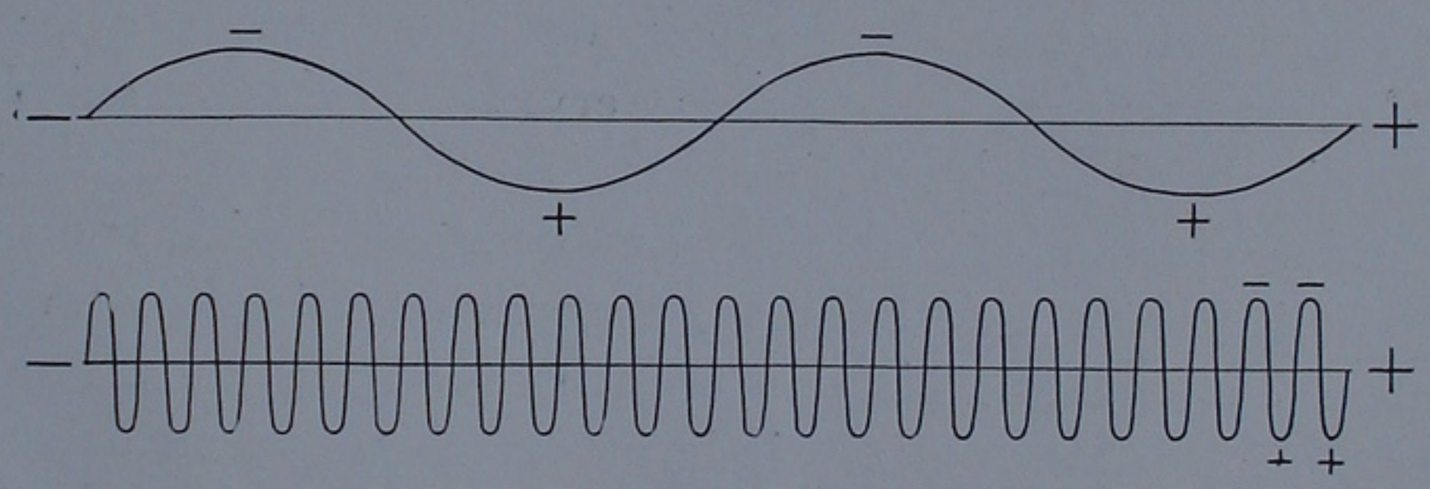


Fig. B

The above description is what is understood to be a true sine wave as in Figure A, while in Figure B the same sine wave principle is carried out, only many hundred times more rapidly, until the identity of the sine wave is lost and a thrilling sensation, instead of a distinct muscular impulse, is felt. Then, by the use of the various shaped discs, called Cams, the different actions as desired will be produced in a very pleasing manner.

As an illustration, the true sine wave, so-called, may be compared to looking through a slowly revolving wheel where the spokes can be plainly distinguished, and one revolving so rapidly that the spokes are not recognizable, a la sine wave of the Morse Wave Generator. The above simile may enable one to understand further the principle involved.

INTERSTITIAL ELECTROLYSIS

Interstitial Electrolysis is a process whereby tissues may be dissolved by means of a metal contact with the negative pole.

Electrolysis is the decomposition of a chemical compound into its constituent parts by an electric current. If a galvanic current is made to pass through a liquid composed of different elements it is possible to set up a chemical action which results in a separating process of its ingredients. When the process is applied in a proper manner to living tissue a local destructive action is inaugurated at the point of contact of the negative pole and Interstitial Electrolysis takes place, the extent of which is in proportion to the length of time and strength of current used.

But for the general practitioner who is constantly annoyed by his inability to successfully treat his cases of Cervical Stenosis, Urethral Strictures, Oesophageal Stricture, Rectal Stricture, and the like, the technique consists of placing a positive surface electrode on the body and proper shaped negative electrode for the case at hand placed in position, and a current of three to five m. a. only, from D. C., R. I, not over three minutes in the Urethra, or five minutes in the Cervical Canal. Even less current is used for small growths.

It always must be, regardless of all instructions, the operator's knowledge and judgment, just when and to what extent the method is to be employed.

METALLIC ELECTROLYSIS

Metallic Electrolysis is a process by which metals, when placed in contact with a moist surface, are oxidized by the positive pole. In therapeutics an inflamed Mucous Membrane is the usual seat of application. In other applications to Mucous Membranes, where the effect of the positive pole is desired, and not the special virtue of any particular metal, only carbon, gold or platinum can be used, as they are insoluble by the galvanic current. The price of gold and platinum being an objectionable feature and carbon being an equally good conductor, the latter is nearly always used.

In Metalic Electrolysis, copper or zinc-tipped electrodes are commonly used, but any soluble metal that may be adapted to the case, will serve the purpose.

The method of procedure consists in the placing of an electrode tipped with copper, zinc, or whatever metal may be

used, made in the various shapes and sizes to conform to the several cavities where used. As an illustration, for a Vaginal Catarrh, use a negative abdominal electrode, No. 1 Cam, D. C., R. I. and a current of about 10 m. a. for ten minutes, oxidation of the metal takes place forming an oxychlorid of copper at the point of contact. The current flowing from positive to negative pole causes the astringent, deposited on the inflamed surface, to be forced into the tissues sufficiently to cause a more curative action than would happen if a solution of copper or other metal were used. Care should be taken that not only the insertion may be made without undue pain, but that the removal of the electrode may not denude the Mucous Membrane. To prevent such an occurrence reverse the current. The negative pole will quickly release the adherent tissues about the electrode without having any contra-effect on results obtained.

In bleeding Hemorrhoids, Fig. 4, Erosion of the Crevix, Granular Conjunctivitis, and Pharyngitis, the application of zinc or copper-tipped electrodes by the metallic electrolysis method with proper technique, produces results much more rapidly than by the ordinary applications. Greater care must be observed as to arrangement of voltage and amperage in the more delicate areas.

The advantages of the method over the local application of sulphate of copper in stick or in solution, of zinc, in paste or solution, or of iron in solution are as follows:

First, the medicinal action of the metallic salt upon the diseased surface is more accurately localized. For instance, in the treatment of a deep sinus, a copper probe may be carried to the bottom and the copper salts deposited there where most needed; second, drugs introduced into the system in a nascent state are much more active than in chemical combination; third, by cataphoresis, the salts formed are driven into the tissues, rather than laid upon the surface of a mucous membrane, as in ordinary topical applications; fourth, there is obtained in addition the beneficial action of the physiologic properties of the current.

The technique of the treatment is similar to that of any galvanocaustic application, save that necessarily, the positive pole is always the active one, and for the usual electrodes there are substituted bulbs and needles of copper, zinc or iron. These are the metals that seem to have the widest range of usefulness as therapeutic agents.

Cataphoresis, or electrical osmosis, means the introduction of medicaments by means of electricity into the body through

the skin, or Mucous Membrane. It is purely a physical process, and has nothing to do with electrolysis, either interstitial or metallic, the principal use of which is to produce local anaesthesia for Neuralgia, superficial pains, and cutaneous operations.

A solution of Cocaine is probably the most common application, by this method, for the relief of pain and superficial operations, although a mixture of Aconite and Chloroform, or Belladona, or any drug as may be indicated.

The positive pole would be the active one in the cataphoric method, a very small absorbent cotton or sponge electrode being used, and the negative on the opposite side of the part, using No. 2 or 3 resistance. The strength of the current may be used to the point of easy toleration. The less current used, the more time will be necessary to produce results.

When using a saturated solution of Iodide Potassium, as in the treatment of Goitre, and joint affections, the negative should be the active pole.

ELECTRICITY IN GYNAECOLOGY

The electrical treatment of diseases of women has one element in it, which prevents it from ever being looked upon with favor by the brilliant surgeon, who can make or mar a woman's fate in the brief space of an hour. While just as much diagnostic skill is required as in surgery, electrical treatment unfortunately requires an enormous amount of time, comparatively speaking.

The surgeon who is unacquainted with the therapeutic action and value of the constant current, has an antipathy for any other method, except the knife, in the removal of any form of growth. He is also indifferent to the post-operative consequences, which so often make invalids for life, because of surgical adhesions and intestinal distortions, which might have been avoided.

The diseases and functional disturbances which are amenable to successful treatment by electricity are Amenorrhoea, Dysmenorrhoea, Menorrhagia, Cellulitis, Non-purulent Salpingitis, Endometritis, Metritis, Subinvolution, Superinvolution, Uterine Fibroids, Deficient development, Stenosis of the Cervix and Uterine misplacement.

In giving instructions for the use of electricity on any part of the body, it has to be assumed that the diagnosis is sufficiently clear, and that the operator is equally as cautious that he may not invade pathological areas where the current would be useless

or do positive harm. No where should the above statement be so strictly followed as about the delicate structure of the Uterine Appendages.

The following suggestions outline procedures which apply to the majority of cases, the prescribed dosage required under the pathological conditions, which is of great importance in becoming familiar with the method, should always be kept in mind.

Fibroids of the sub-mural or sub-peritoneal variety, those large enough to cause obstruction of any consequence, or a rapidly growing one in a patient under thirty-eight, are strictly surgical.

With an average case of Interstitial Fibroid, whether hemorrhagic or otherwise, the proper technique being pursued, the patient can be made symptomatically well, with a tumor diminished more or less, according to the faithfulness with which she continues her treatment, until pronounced unnecessary.

The growth will disappear no more than will the Uterus, as it is a past of it, but a diminution in size, to the extent of relieving pressure, and putting a patient who constantly complains of discomfort, into a condition of comparative ease, will result. What more could a reasonable person expect when the possible dangers of surgery are confronted?

Fig. 1

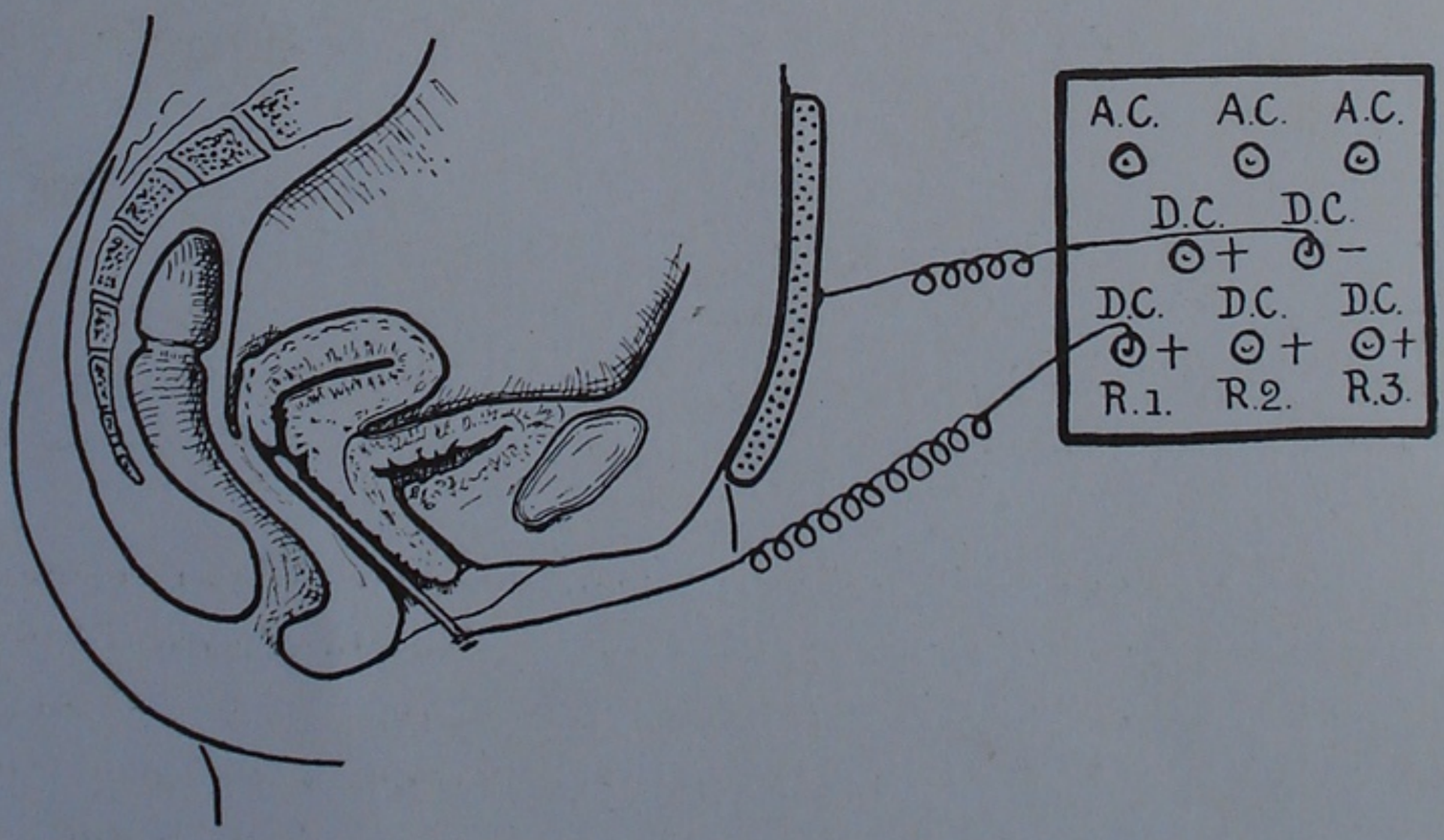


Fig. 1,— represents Carbon Ball Electrode application for the treatment of Uterine Prolapsus and similar conditions. A current strength of 15 m. a. with large surface Electrode for 10 minutes usually is sufficient.

Many of the Fibroid cases, as in simple misplacements,

have more or less backache. Placing a smaller electrode (4″ x5″ or 5″x6″) on the back, leaving the vaginal electrode in place, and applying the alternating current, using the same No. 1 Cam, which procedure takes but little time or trouble, will allow the patient to leave the office with a feeling of relief from her dragging, painful sensation, and in place have one of more or less exhileration.

In the hemorrhagic form of Uterine Fibroids, the above technique may be carried out omitting the stimulating part of the alternating current on the back, and the use of the intra-uterine copper or zinc electrode, which will be described under "Metallic Electrolysis".

The application to the endometrium with a soluble (zinc or copper) electrode requires considerable dexterity in manipulation.

In ordinary uncomplicated Uterine prolapse, Retroversion, Anteversion, Relaxation of Vaginal Walls, the same technique as applied to non-hemorrhagic Fibroids is used with the vaginal electrode (postive) followed with alternating current on the back. If, for any reason however, in the last condition mentioned, the direct current is not to be used, then the regular size vaginal electrode is to be adopted, using Cams No. 1, 2 or 3, according to the amount of stimulation desired for the individual case in hand Fig. 1.

Another form of technique in using the Generator on either A. C. or D. C., is obtained by placing two surface electrodes, one on the Lumbar, the other (larger one) just above Pubes, using a bifurcated cord and the single cord attached to the internal electrode. This procedure allows more current to be used and is considered advisable. See Fig. 2.

In Uterine flexions, the above considerations do not apply until the flexion is relieved, as there is a pathological condition at the angulation, which can be best cared for by using negative galvanism at the flexion with not over 10 m. a. for ten minutes, for the local nutritional effect, followed by alternating current, if conditions seem to indicate.

Fig. 2

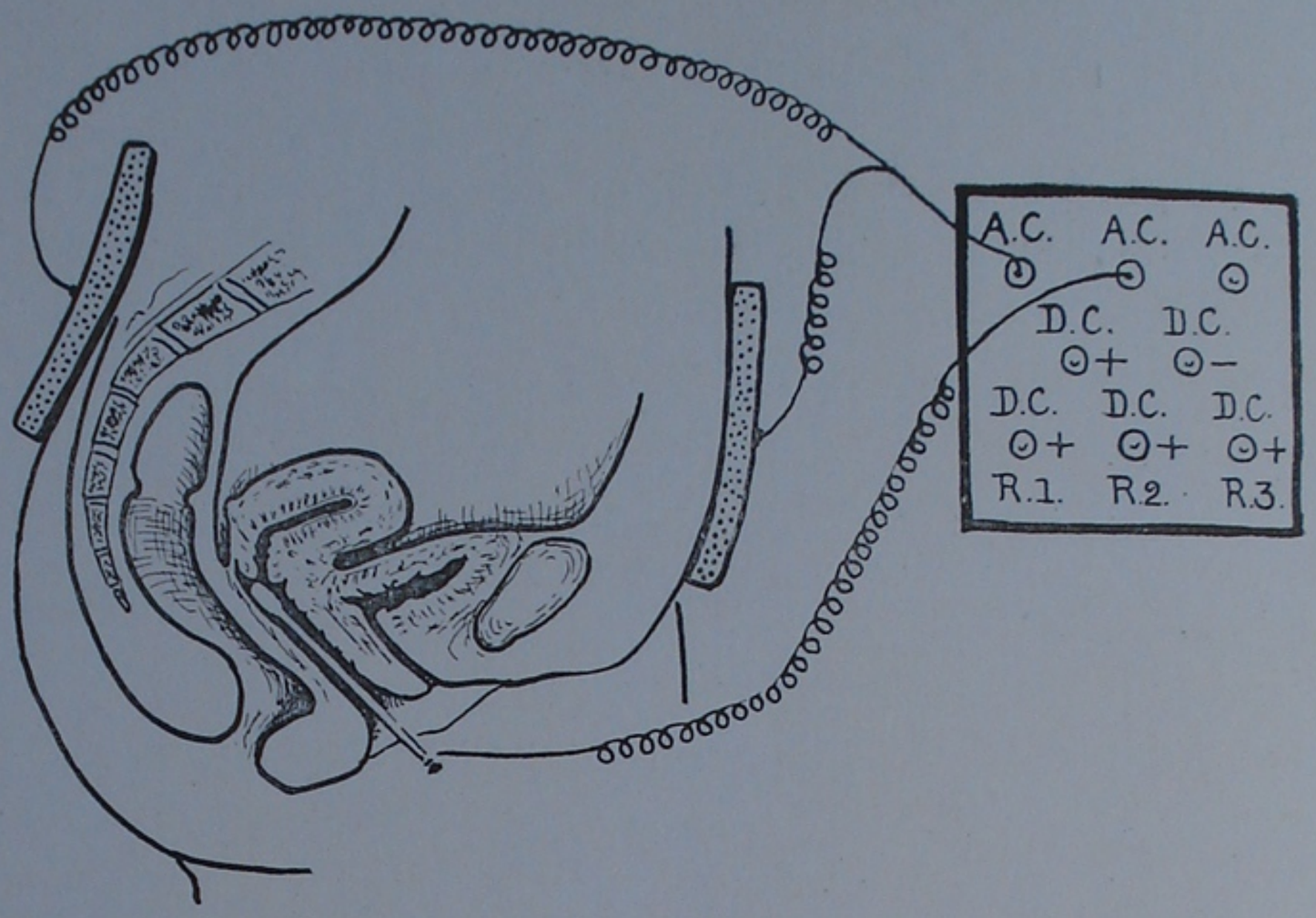


Fig. 2,— shows continuation of the same treatment as described with Fig. 1, with the internal electrode remaining in place and a surface electrode on the back with the A. C., using Cam No. 1, the strength to be the point of easy toleration.

Fig. 3

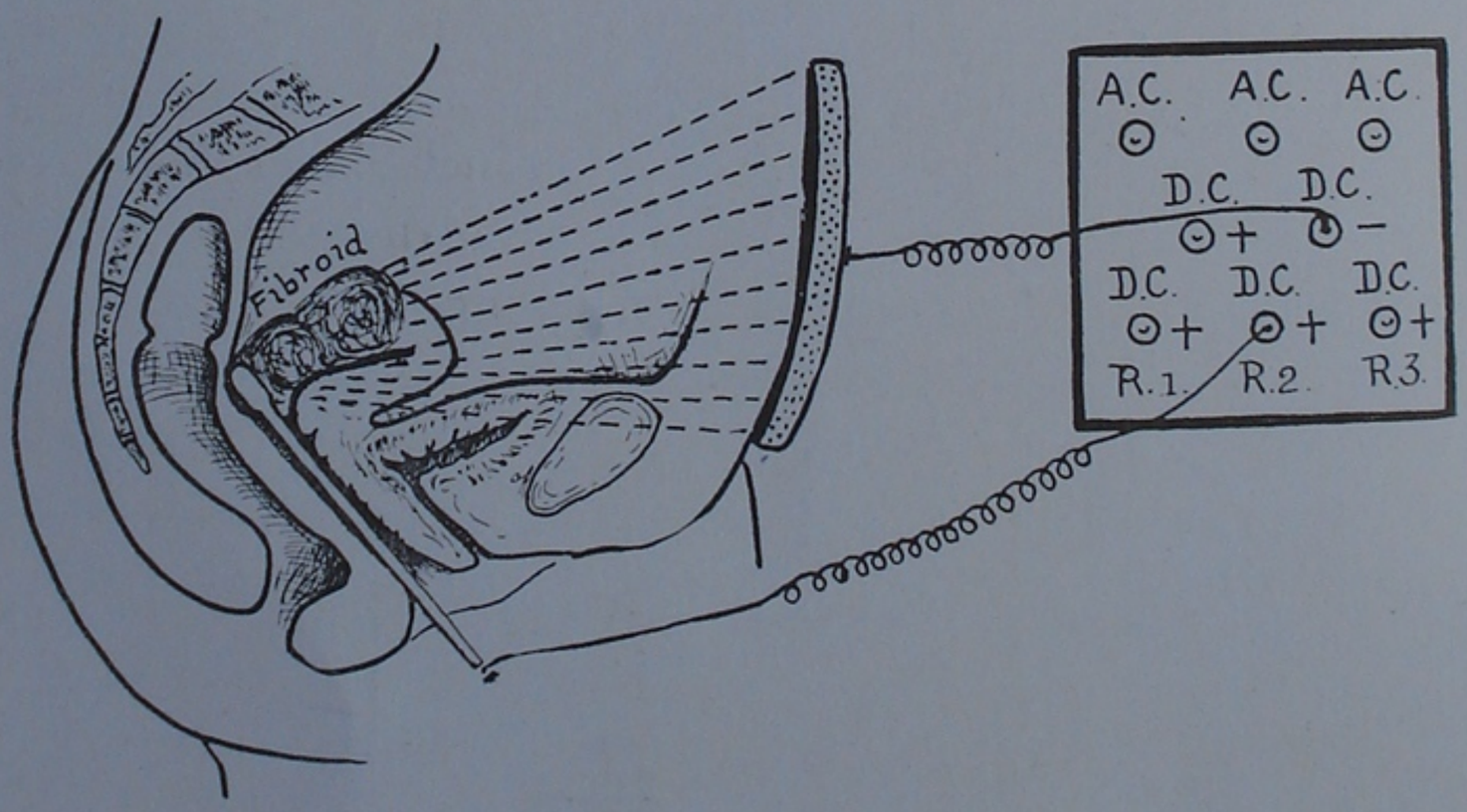


Fig. 3 represents a medium size of interstitial Uterine Fibroid situated posteriorly and easy of access. Use the carbon ball electrode covered with absorbent cotton moistened with some antiseptic solution or, better, have antiseptic gauze moistened to complete saturation for good conduction. Do not use vaseline or other demulcents of an oily nature as it will interfere with conductivity. Non-irritating surgical soap is better. Place

the electrode described, firmly against the best presenting surface of the Tumor. In the above case the Fibroid is in posterior Cul-de-Sac. With the abdominal electrode thoroughly saturated press every inch of its surface against the skin. Use D. C. R. 1 or 2, and possibly D. C. without resistance. Turn the current on gradually until the desired milli-amperage 20 to 30 M. A. point is reached. It is best in susceptible hyper-sensitive patients to start with about two-thirds of the intended dose, and in less than two minutes, as the skin has become better moistened, with less resistance, the full amount may be added.

If the Fibroid is situated anteriorly or laterally, the point of contact should be adjusted accordingly so that the current, as indicated by the dotted lines, may penetrate upon it from the abdominal electrode, which should be the largest size. If it is not a hemorrhagic case, the internal electrode may remain in place and an alternating current used through the back as shown in Fig. 2, using Cam No. 1, for its local tonic sedative effect, rather than any special action on the tumor itself. The abdominal electrode, during the use of the alternating current, would, of course, have been removed. If a longer period than twenty minutes is permitted for a galvanic current to pass through the tumor it is quite possible that the patient may complain of a deep-seated pain, which would be due to the contractile interpolar action. A word of caution here is necessary: if the patient complains of a deep pain or feeling of soreness after the current is turned on, ascertain at once if there is a pus tube, or adhesions about the Caecum or elsewhere, from which harm might come, if the treatment is persisted in. Possibly discomfort might be caused by the vaginal electrode pressing a little too firmly; release it slightly to remove the difficulty.

Fig. 4

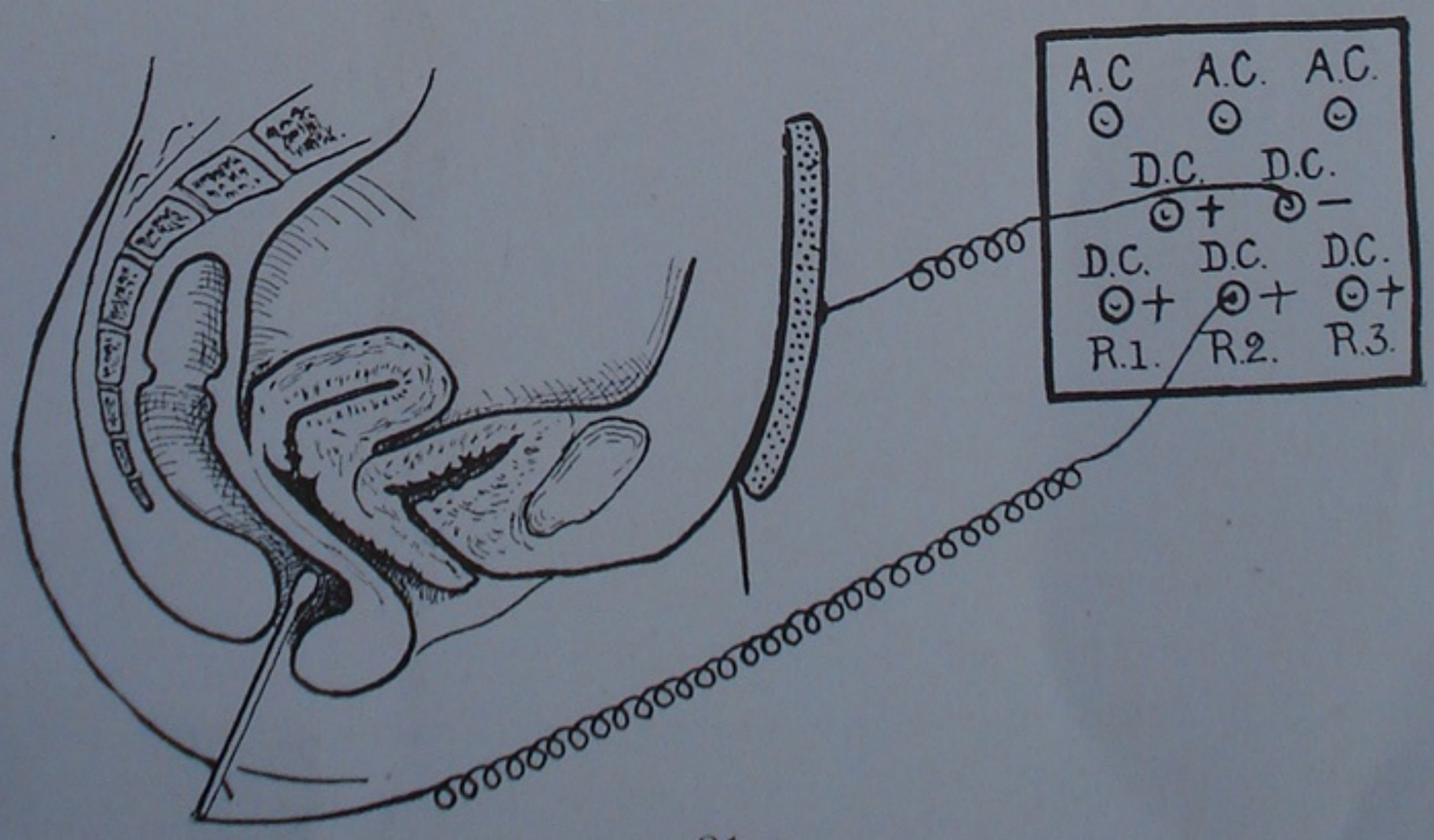


Fig. 4,— represents a Copper Electrode inserted in the rectum for treatment of Hemorrhoids, for which a current strength of about 8 M. A. for ten minutes will usually be sufficient. The abdominal Electrode should be of the largest size, the current should be turned on and off slowly, and the electrode removed with care as instructed under Metallic Electrolysis.

In making local applications of the A. C. and the D. C., to prolapsus in any form, always bear in mind the great possibility of an existing impacted Sigmoid, the weight of which may seriously interfere with the success of gynaecological treatment, no matter how well it is performed.

Profuse and irregular menstruation can usually be intelligently cared for by positive vaginal treatments, using Cam 1, R. 3, not over 15 M. A. for fifteen minutes.

In Dysmenorrhoea the success of the treatment will depend upon the accuracy of the diagnosis, whether from either ovarian or uterine misplacement, or Stenosis of the Cervix. Stenosis of the Cervix, especially in young and unmarried women, is the most common cause. In this case the proper procedure is to dilate the cervix by electrolysis, using graduated electrodes made for the purpose, and the negative pole of the constant current. A current of six to eight M. A., is easily borne and is sufficient to cause the necessary softening and relaxation. A stronger current might take less time, but the possibility of cauterization would be greater and ought to be avoided, to prevent cicatrical tissue following. By carefully following well-known rules and regulations in the use of the galvanic current, permanent dilation of the cervix can be accomplished. The results are in marked contrast to those obtained by the usual method of forcible dilation under anaesthetics, which results are only temporary.

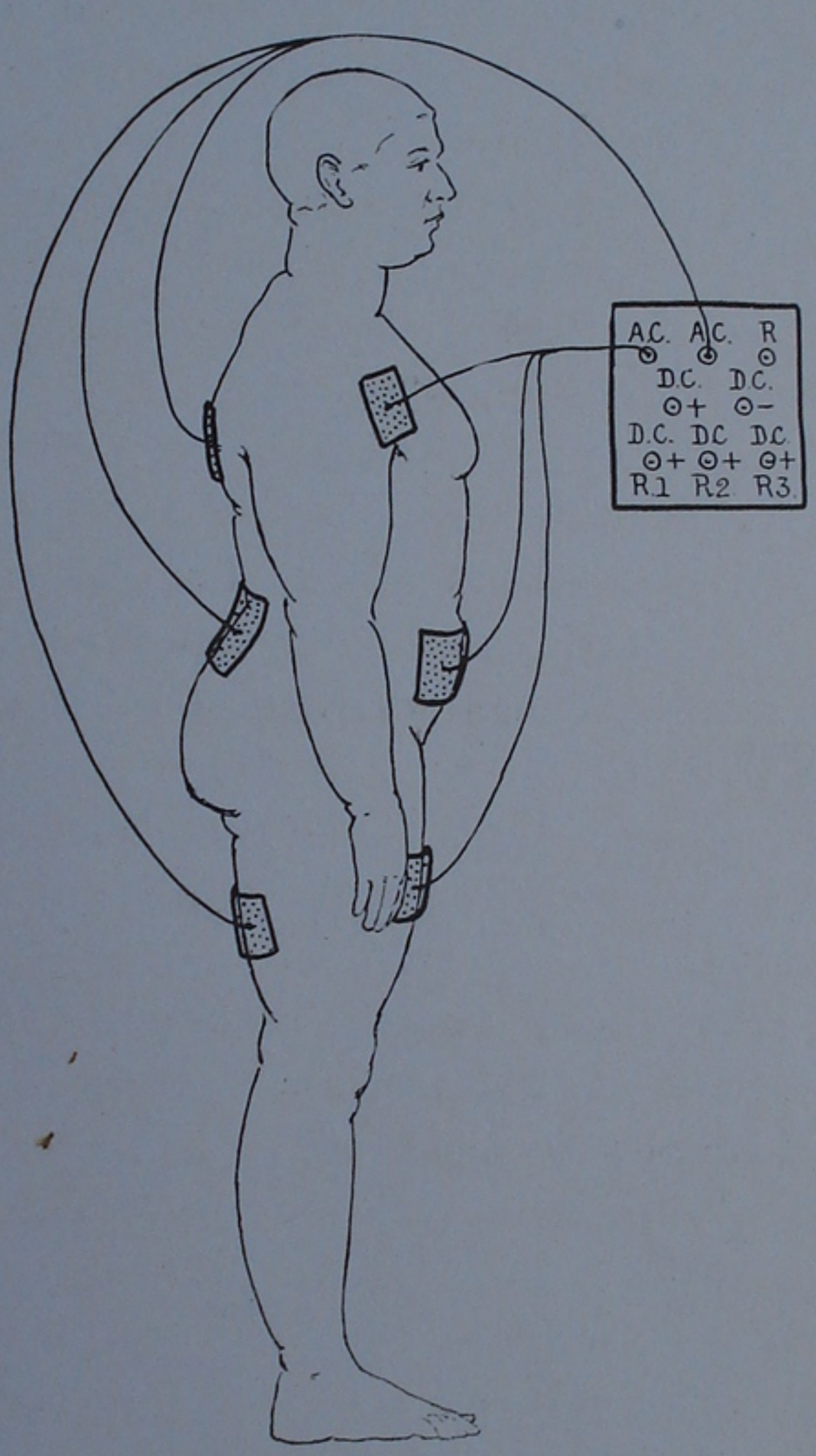
Endometritis with vegetations and granulations is characterized by pain and hemorrhage. The usual treatment is to dilate the cervix and use the curette to remove the vegetations and granulations. These indications are overcome in a very complete and satisfactory manner by negative intra-uterine applications of galvanism. The electrolytic action is used to destroy the granulations and vegetations, and the antiseptic and tonic effect of the pole aids in accomplishing healthy reproduction.

CONSTIPATION

Probably no word in medical literature has been more wrongly interpreted in its pathology, than the term "Consti-

pation." The careless and indifferent use of cathartics, the latitude with which physicians allow their patients the indiscriminate use of drugs and the lack of directions relating to diet, drinking water, posture, etc., are responsible for the usual existing conditions in Constipation. All that is later given upon the treatment of Intestinal Stasis applies more than to anything else, to its symptom, Constipation.

Fig. 5.



OBESITY

Obesity, the bugbear of physicians, is a problem requiring much patience and many treatments to bring about desired results. The fact is that the average obese subject persists in living wrongly as regards diet and exercise, but much can be done to relieve the patient by the combination of proper diet and vigorous muscular gymnastics.

The Generator used with several (4x5) small electrodes properly placed over the fatty areas using Cam 6 or 7 with the

alternating current and frequent treatments, may accomplish much. In this treatment use two or more bifurcated or trifurcated cords. Fig. 5., with electrodes placed where muscular gymnastics can be produced to the best advantage.

Reducing a fleshy person by dieting without exercise, is likely to leave the person old and flabby in appearance. If treated by physical measures alone, ignoring diet, the old condition will return, when the treatments are stopped, but an intelligent combination of diet and rapid wave current treatments, is usually productive of satisfactory results.

In the treatment of Gout, Rheumatism, the diseases of the Spinal Cord, (Chronic Myelitis, Locomotor Ataxia, etc.,) and the various Neuroses, the instructions already given for the use of the constant current apply.

BRONCHITIS

Sub-acute and chronic Bronchitis is treated by using Cam No. 2, A. C., the 4″x6″ electrode on the back and the 4″x5″ under the Clavicle, treating each side separately, or using a bifurcated cord and two small electrodes in front. The latter procedure saves time.

EYE, EAR, NOSE, THROAT

The Eye, Ear, Nose, Throat, and delicate areas require special shaped electrodes, but very often one can improvise with material at hand to meet special cases.

RHEUMATISM

The conditions known as Neuritis, Neuralgia, and Muscular Rheumatism, are quickly relieved by the use of the galvanic current.

For relief of pain and inflammation, the positive pole should be over or above and the negative pole below the parts to be treated, in acute conditions and inversely chronic conditions the negative would be the active pole.

Considerable strength of current can be borne through Arthritic joints, giving quick relief to swelling and pain, which of course is only symptomatic treatment, as the usual causes, Intestinal Stasis, Infected Teeth or Tonsils, and specific conditions may have to be considered.

PROSTATIC ENLARGEMENT

The success attending the treatment of chronic Prostatic Hypertrophy with the Static machine and High Frequency apparatus has caused much controversy amoung surgeons who consider only one method; namely, operation.

Prostatic surgery shows such a large proportion of fatalities and often such deplorable conditions afterward, that that procedure is to be avoided, except when actual obstruction, Cystitus or Malignancy, is threatened.

If a troublesome Prostate, causing frequent urination, can be relieved, so that the patient is symptomatically cured, even though enlargement still exists, much has been accomplished. Such relief the author has given to several hundred patients.

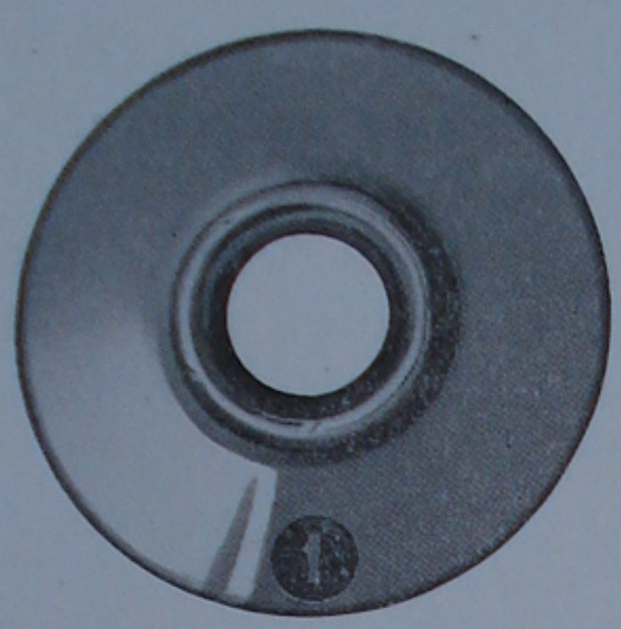
In treating Prostatic Enlargement, with the patient on the side, place on the abdomen the large (6″x8″) electrode and a Prostatic electrode against the Prostate, with some device for holding it in place. Use a No. 6 or 7 Cam, A. C. from ten to fifteen minutes with a current of sufficient strength to be felt in the Rectum. Applications should be made not oftener than three time weekly, at first. Gradually extend the time between the treatments.

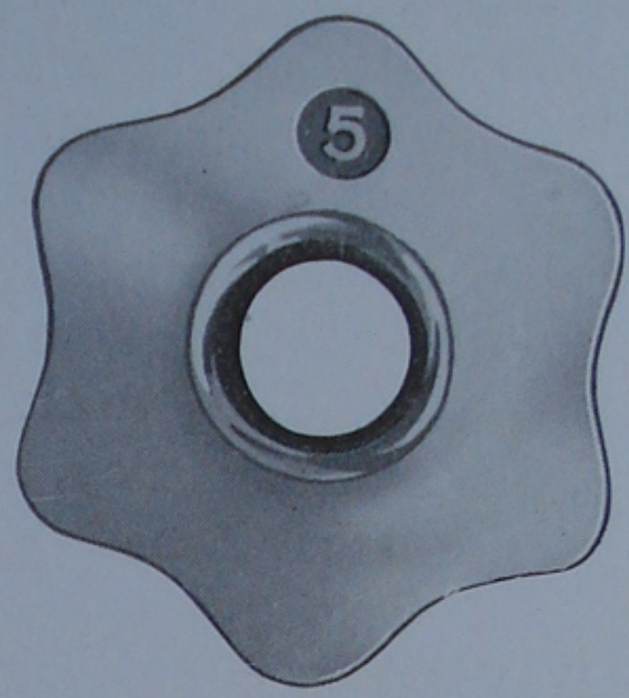
FLAT FOOT

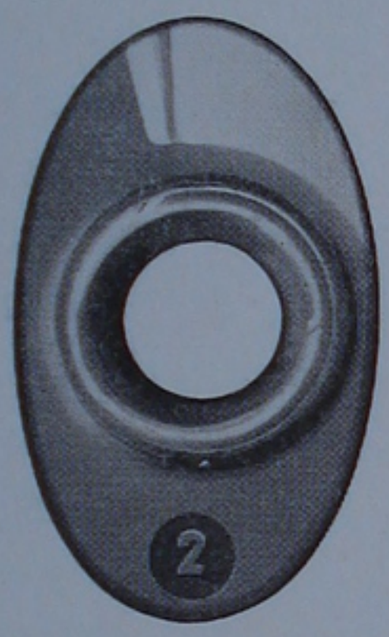
Many conditions of distorted ankles and feet are called Flat Foot, without considering the pathology. The average case, with the foot rotating inwards, should be treated as follows:— Place a small electrode on the inner side of the arch and another on the upper origin of the Tibialis Anticus muscle at the knee, using Cam No. 1, negative galvanic, on the inside of the foot, then Cam No. 5, A. C. for a few minutes; repeat often enough to regain the tone of the weakened muscle.

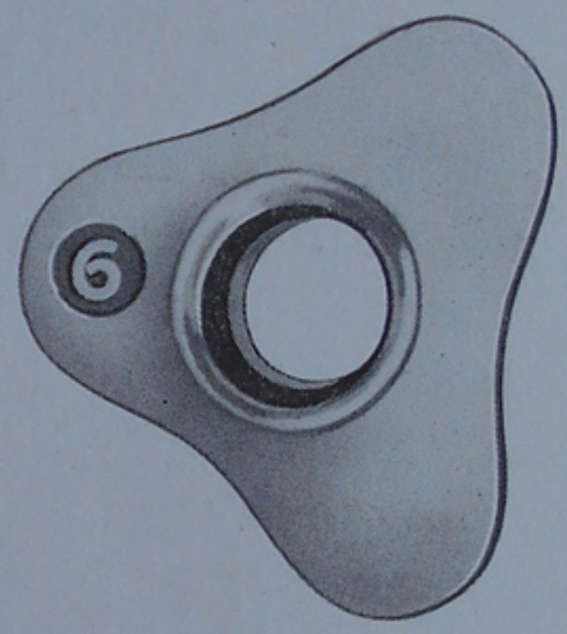
SELECTED MOTION CAMS

The use of which will be more fully described under the subject of treatment

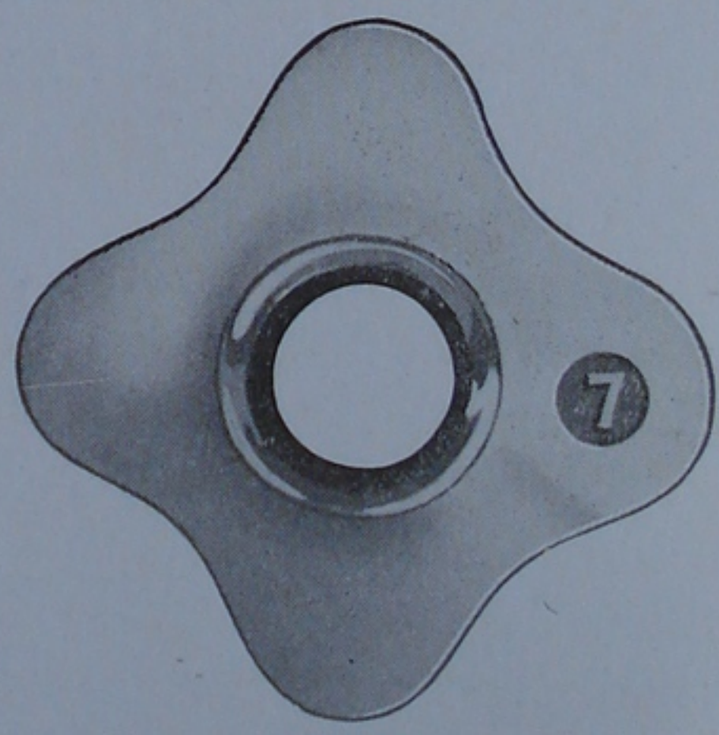




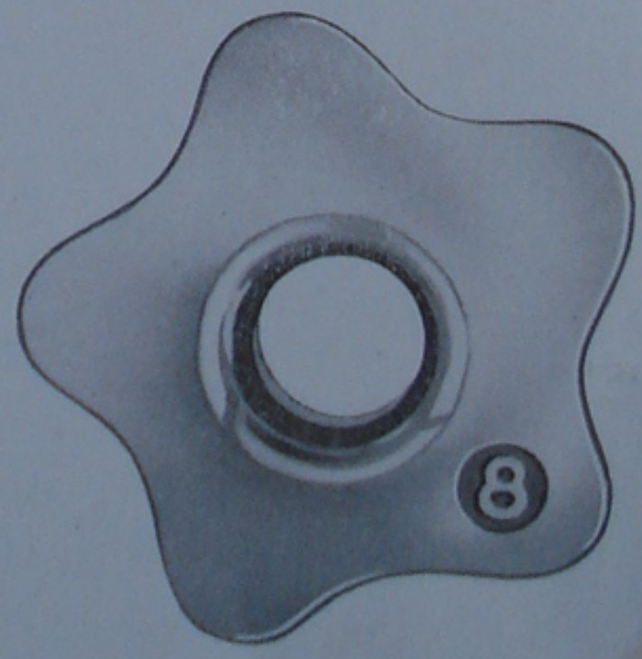












CAMS

When the Generator is put into operation, the rapidly revolving armature and magnetic field are made to approach and recede in automatic manner. The length and character of the waves, and the consequent muscular contractions are regulated by the shape of the special cam selected for the work to be accomplished.

CAM NO. 1

This Cam produces a cellular massage, without surge, by virtue of its rapid vibratory impulse. This current is particularly useful in muscular weakness, especially of the extremities, and for improving local metabolism and restoring tone to the parts.

CAM NO. 2.

Cam No. 2 produces a current of twenty-two surges per minute, with equal periods of contraction and rest. This current is particularly indicated in infantile paralysis (chronic stage) and paralysis of the extremities. Its use causes contractions of atrophied muscles, at a rate that harmonizes with that normal muscular activity.

CAM NO. 3

Cam No. 3 is especially useful for parts, requiring a delicate massage with deep penetration. This cam is so constructed that the rise to the maximum potential, or peak of the surge, is extremely gradual, producing a gentle contraction, indicated for exercise of muscles, whose natural function is associated with the organs of digestion.

CAM NO. 4

This cam produces a heavy contraction, which is prolonged at the peak of the surge with abrupt diminution of intensity of short duration, followed by an equally abrupt rise. Cam No. 4 is the most useful of all, as it is particularly indicated in the treatment of INTESTINAL STASIS, STOMACH DILATATION, and constipation, with its subsequent complications. Like Cam No. 3 it has eleven surging wave impulses per minute.

Cam No. 4 is constructed to synchronize with the normal peristaltic action of the gastro-intestinal tract and aid nature in the restoration of muscular tone and to exercise the muscles controlling these organs.

CAM NO. 5.

Cam No. 5 produces a surge, the frequency of which is especially valuable in the treatment of facial paralysis, joint affections, and adhesions where rapid manipulation would be indicated. For nose, ear and throat work in which a delicate and easy tolerated massage is very often desired, this cam is most valuable. This cam produces sixty-six surges per minute.

CAMS NO. 6, 7 AND 8

Cams number 6, 7 and 8, give thirty-three, forty-four and fifty-five muscular impulses respectively, per minute, the indications for the use of which must be necessarily variable, according to the pathology of the case at hand.

By using a surface electrode of at least 6″x8″ with properly shaped and insulated prostatic electrode, Cams No. 6 and 7 can be made to imitate manual prostatic massage, in a very satisfactory manner.

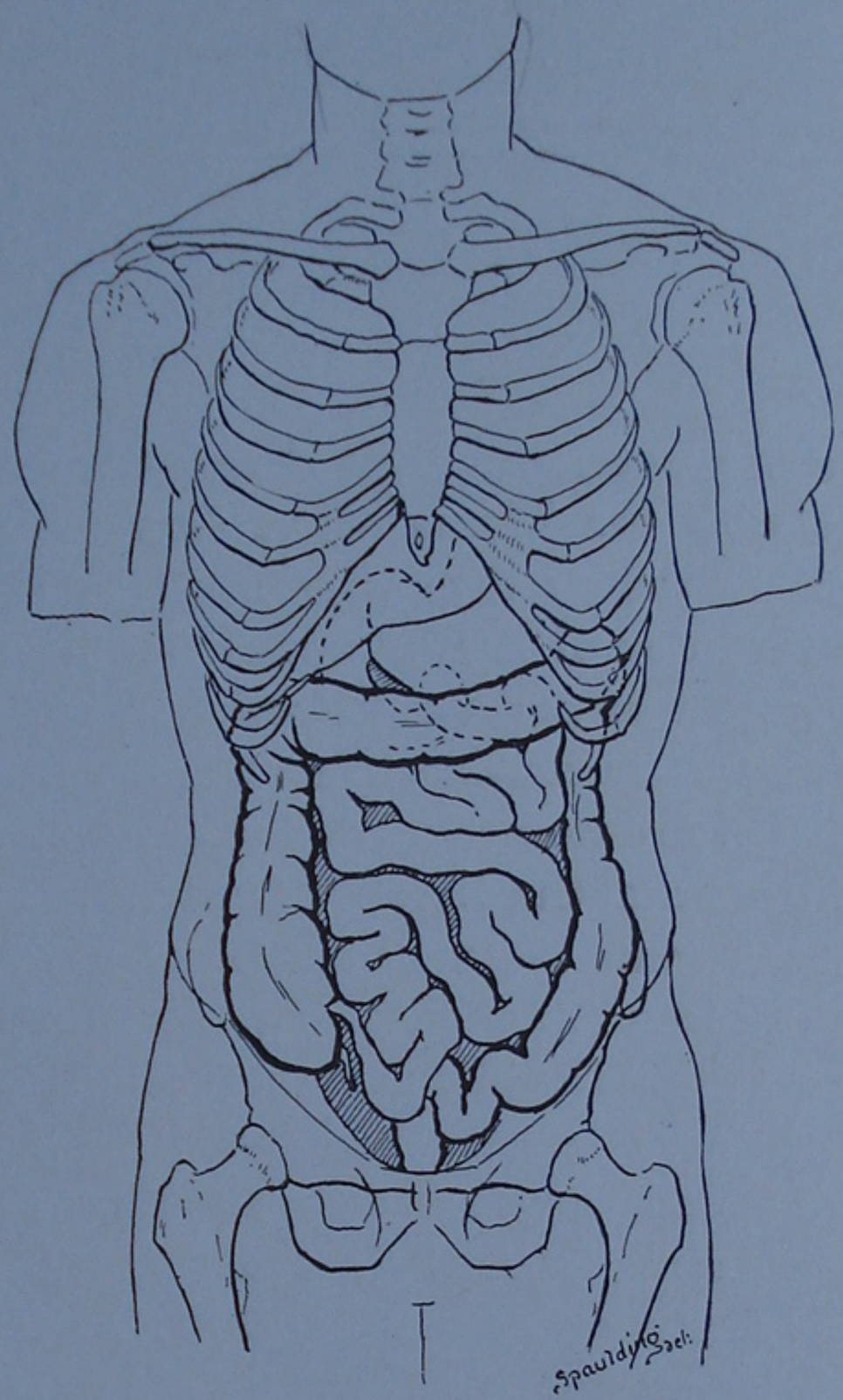
In affection of the knee and ankle, and in the treatment of flat foot, cam No. 8, when used vigorously, gives a good imitation of normal muscular and ligamentus action in those sections.

In many of the cases named, especially in which cams 2, 3 and 4 are used, and in which normal muscle movement is to be imitated, the use of either the 6, 7 or 8 cam, for two or three minutes preceding the use of others, will cause a sudden invigoration of the circulation of the part, which renders the condition more susceptible to benefit when the regular cam for the case is used.

After the physician has become acquainted with the physiological action of the different cams, he will be able to select what is needed for a given case, without the aid of books.

The following cuts, and their descriptions and indications for treatment with the Morse Wave Generator, should be a sufficient guide to the average physician who is at all familiar with the interpretation of X-Ray work along the digestive tract. Practically all cases of colonic distortion, when the transverse colon is sagging to any considerable extent, must necessarily be caused by ptosis of the stomach. If the stomach is affected and there is no evidence that the digestive tract below fails to function-ate properly, the same instructions as regards the application of the Generator can be carried out except that the smaller electrode in front should be placed transversely under the stomach and the back electrode a little higher on the back. As will be described No. 3 Cam causes eleven muscular contractions per minute, corresponding as near as can be produced to normal peristalsis. The current increases very gradually smoothly until the maximum point is reached and then recedes with the same smooth muscle impulse. No. 4 Cam gives the same number of contractions per minute but by being different in shape the impulse is produced more abruptly and prolonged at the peak of the wave and suddenly subsides. It is advisable, therefore, to use No. 3 Cam in timid, over-susceptible subjects or when treating patients for the first time, and No. 4 Cam when more powerful muscular contractions are to be desired. There are many points in the technique of electrical applications that the physician must necessarily learn for himself. The author feels that words of caution and suggestion that follow should be of real help to the physician who reads carefully and intelligently.

Fig. 6.



This figure represents the natural position of the stomach, colon and small intestines. It is obvious that the rounding character of the corners of the entire Intestinal tract is so designed that during normal Peristalsis there is little or no obstruction or friction to the passage of bowel contents. With normal conditions of intestinal tract there will be no area for retention of toxins, whereby through either direct, local or reflex action, the health of the individual might be impaired.

Any perversion from the normal plan of elimination, as angulation, kink, fold or twist, that in any manner retards proper elimination of waste product, may be the seat of future Ulcer, Cancer, or Adhesions, and surgery, which usually comes too late in these regions, may have to be resorted to.

In the light of our present medical knowledge it is always advisable and, in many cases most essential, to have a careful fluoroscopic and radiographic diagnosis made before resorting to any active measures, either surgical, mechanical or electrical. However, one with fair diagnostic ability should be able, in the

absence of the X-Ray, to be reasonably sure whether the case is one for surgery or not, and act accordingly.

When any external muscle of the body, through injury or disease, becomes impaired in its local function, exercise, the passive movements, massage, electricity, etc., are the rational methods for restoring function. The same should apply to distorted portions anywhere along the digestive tracts and the following cuts illustrate, from the author's own radiographic work, conditions that are met with in the daily work of every practitioner of medicine. If the patient is not too old, or tubercular, or has no specific disease whereby cure is not expected, restoration to normal functioning is possible, in most cases, the degree depending upon the willingness and ability of the patient to follow instructions upon treatment and diet.

Figures 7 to 13 inclusive, represent a fair average of the cases of colonic stasis from raidographs taken in the author's office which were carefully diagnosed by fluoroscopic examination to make sure of the absence of immovable kinks, obstructions or adhesions, that might probably indicate the necessity of surgery.

Fig. 7.

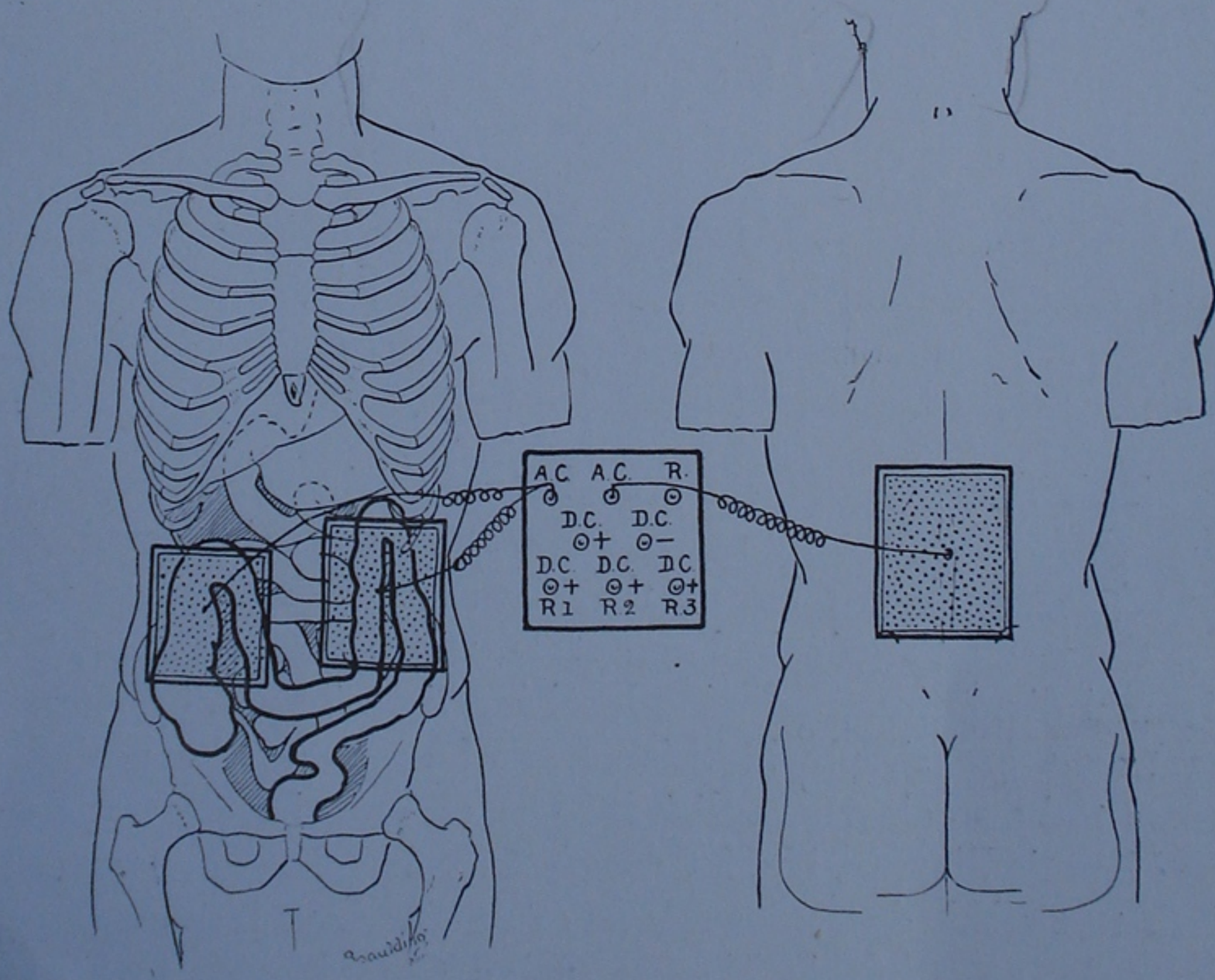
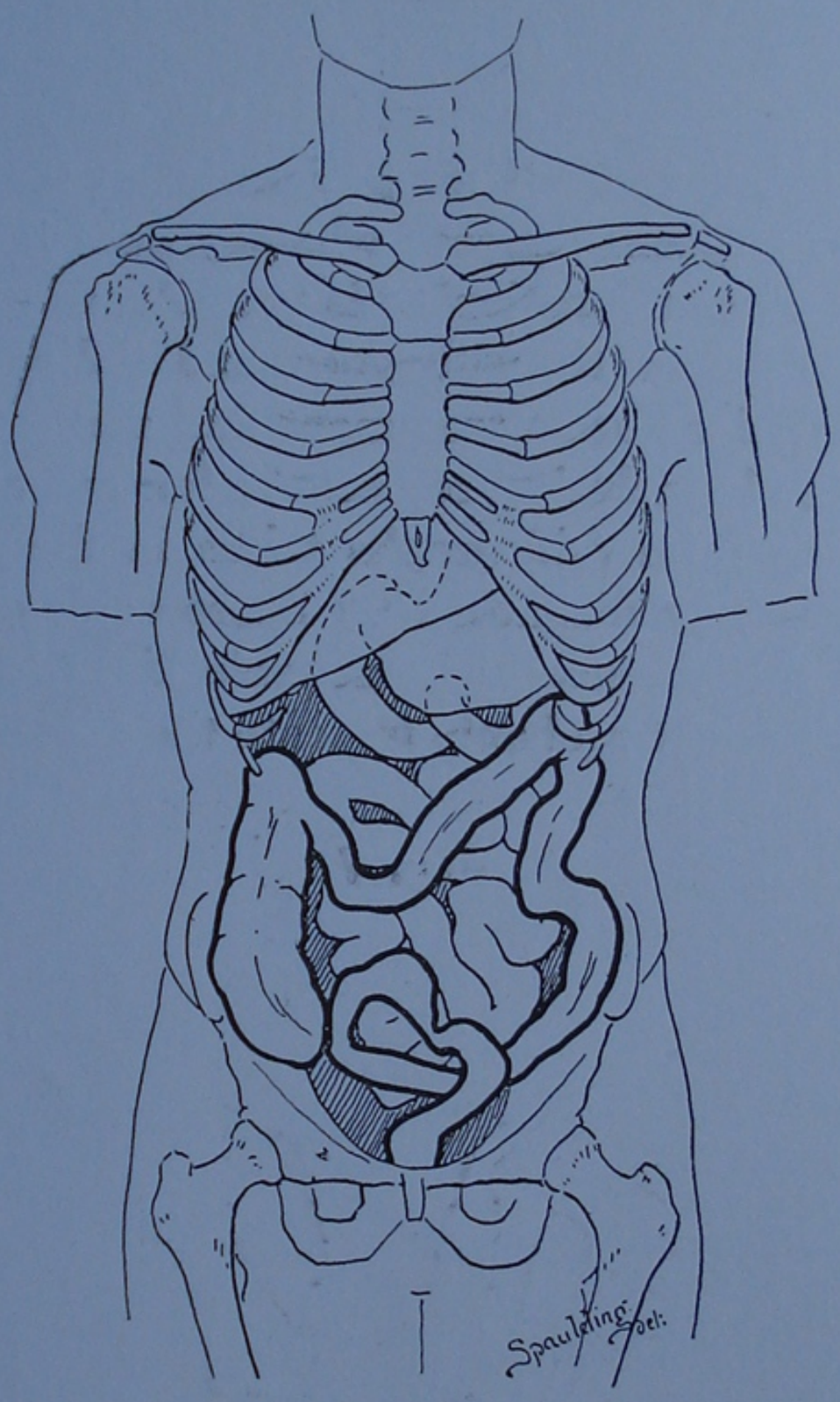


Figure 7 shows a marked case of Colon prolapsus impinging on the Sigmoid, accompanied by a very much prolapsed Stomach, producing severe inertia, obstinate Constipation, nervous dis-

turbance and infection, especially in the joints (Arthritis). With twenty-four treatments, covering a period of two months, laxatives, with the exception of mineral oil once daily, were discarded, and the many painful nervous symptoms apparently cured.

Fig. 8

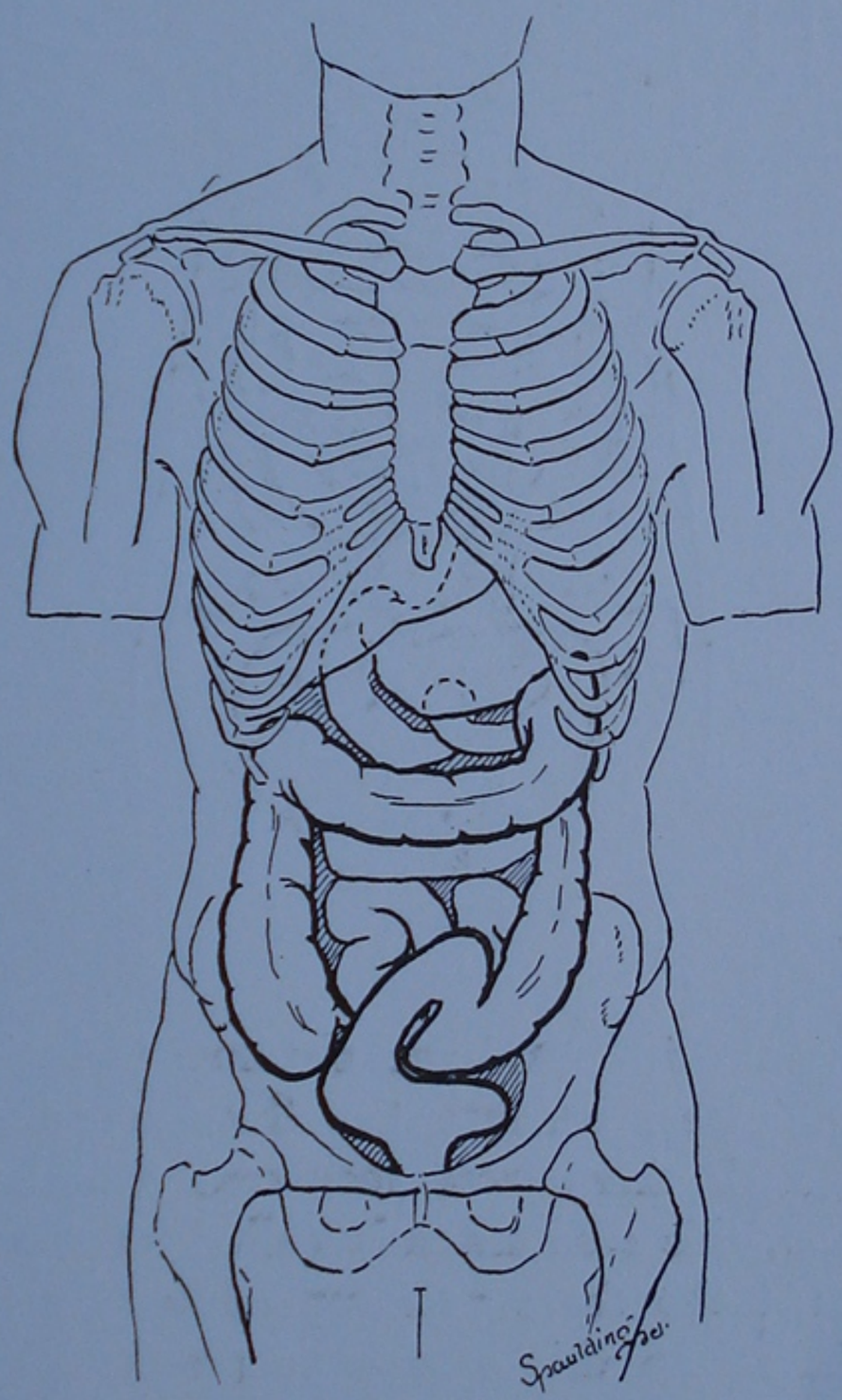


This figure represents a slight angulation of colon at the Hepatic Flexure, a very marked one at the Splenic Flexure, and a well-defined impaction at the Sigmoid. Constipation which was the patient's principal symptom, was caused largely by the Sigmoid distention producing local inertia. The indications for treatment are simple in this class of cases as the pathology seems to be so clearly outlined. Use an anterior electrode over the Hepatic Flexure, No. 3 Cam, A. C., and a larger one over the sixth to twelfth dorsal vertabrae as outlined. Place same sized electrode over Splenic Flexure, using Cam No. 4, to produce longer and more pronounced contractions.

This, as well as the following cases of Intestinal Stasis to be described, will be best treated by using a 4″x5″ electrode on

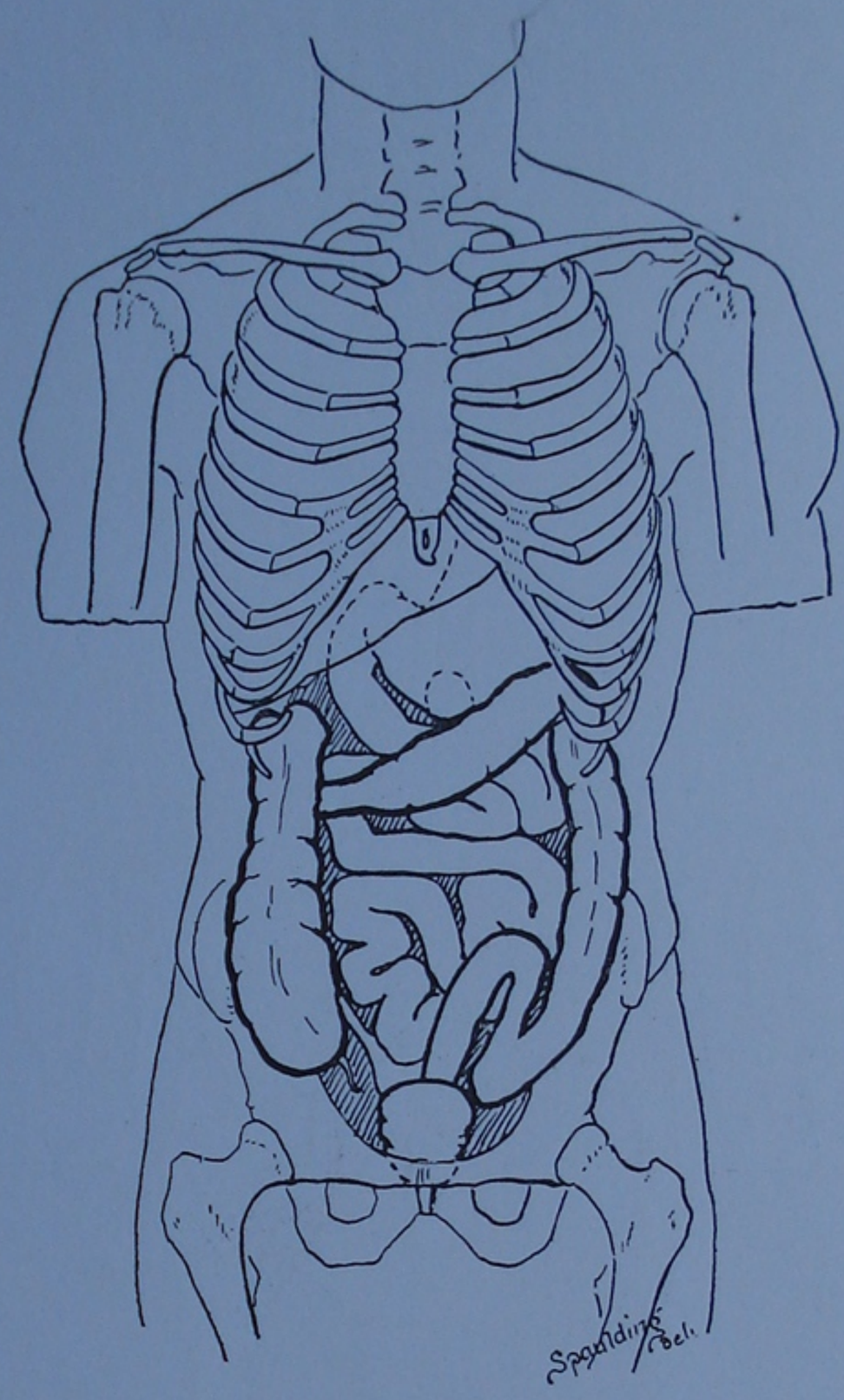
the abdomen and a 6″x8″ Electrode on the back. With the sigmoid electrode, the alternating current alone must be used. For the average case of Intestinal Stasis or Gastroptosis, ten minute treatment on each side with the alternating current is about the proper dosage. Very thin or very obese subjects may require more or less current; the judgment of the operator must determine the amount.

Fig. 9



This figure shows a distended Caecum, and a sharp angulation at the Splenic Flexure with some Hepatic Flexure distortion. The treatment outlined in Figure 7, in short time, relieved the Constipation and long-standing backache, due to infectious Neuritis from the toxaemia.

Fig. 10



This patient did not have chronic Constipation as the radiograph indicates, because the fluoroscope showed active peristalsis, though there were recurrent attacks of Constipation. However, this case urgently called for treatment of some kind to prevent the three pronounced curves from becoming dangerous kinks. In this case good results were quickly obtained, because of the considerable amount of muscular tone still remaining in the threatened pathological area. It is advisable in all cases in which the Transverse Colon is very low, to place an electrode of smaller size (4″x5″) on either side and the larger back electrode sufficiently high to give an oblique effect to the muscular impulse, which would be more "lifting" in character, than if used transversely.

Fig. 11

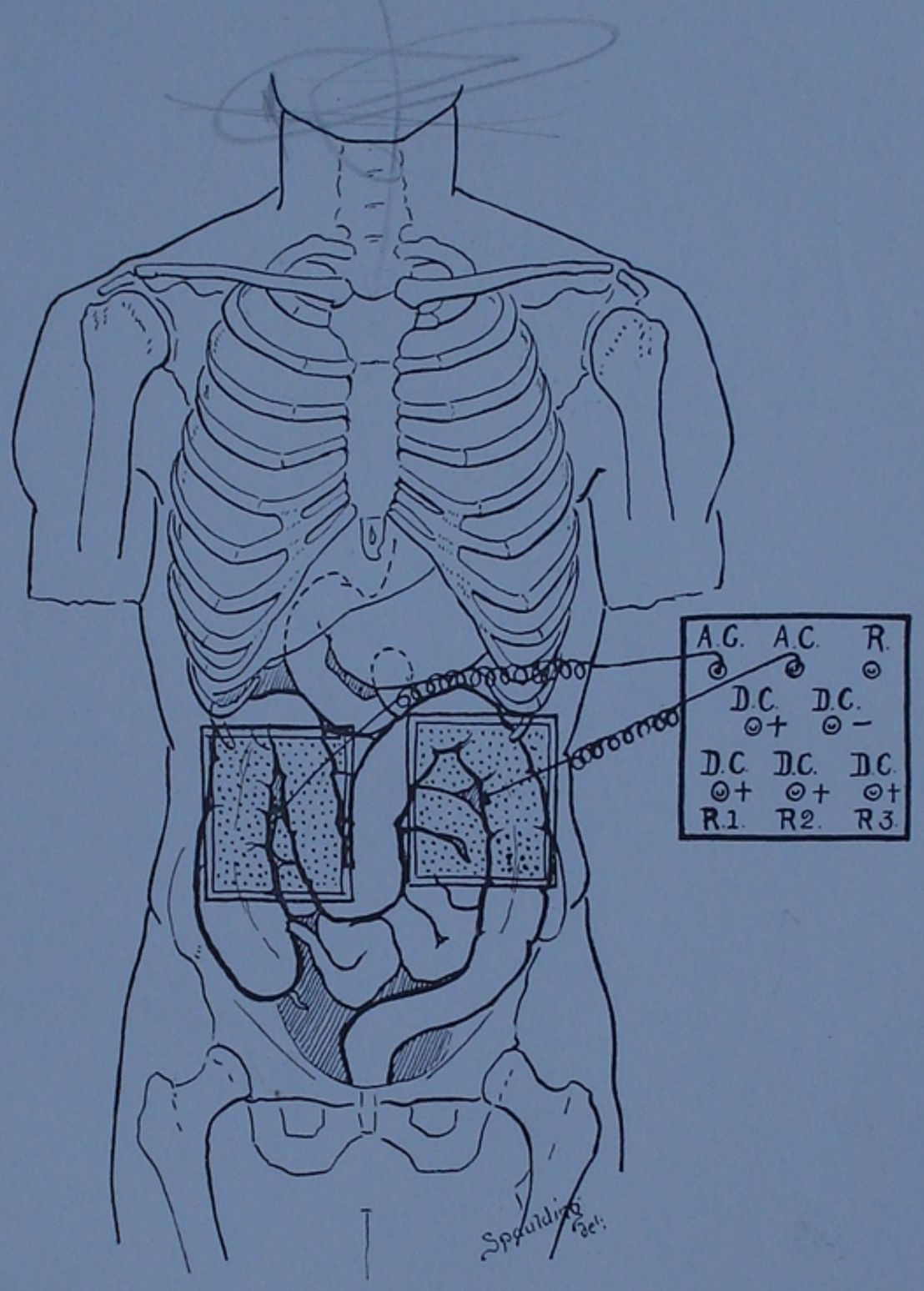


Fig. 11. Showing marked tosis of the transverse colon which would be treated most successfully as outlined by position of electrodes. Of course it is understood that in all cases of Stomach and Colonic prolapsus that a Back surface electrode is used as shown in Fig. 7. The use of one Abdominal at a time is preferable, two, with a bifurcated cord, may be sufficient in the mild form of Stasis; when so used it is advisable to select two electrodes of small size and the larger one for the back.

Fig. 12.

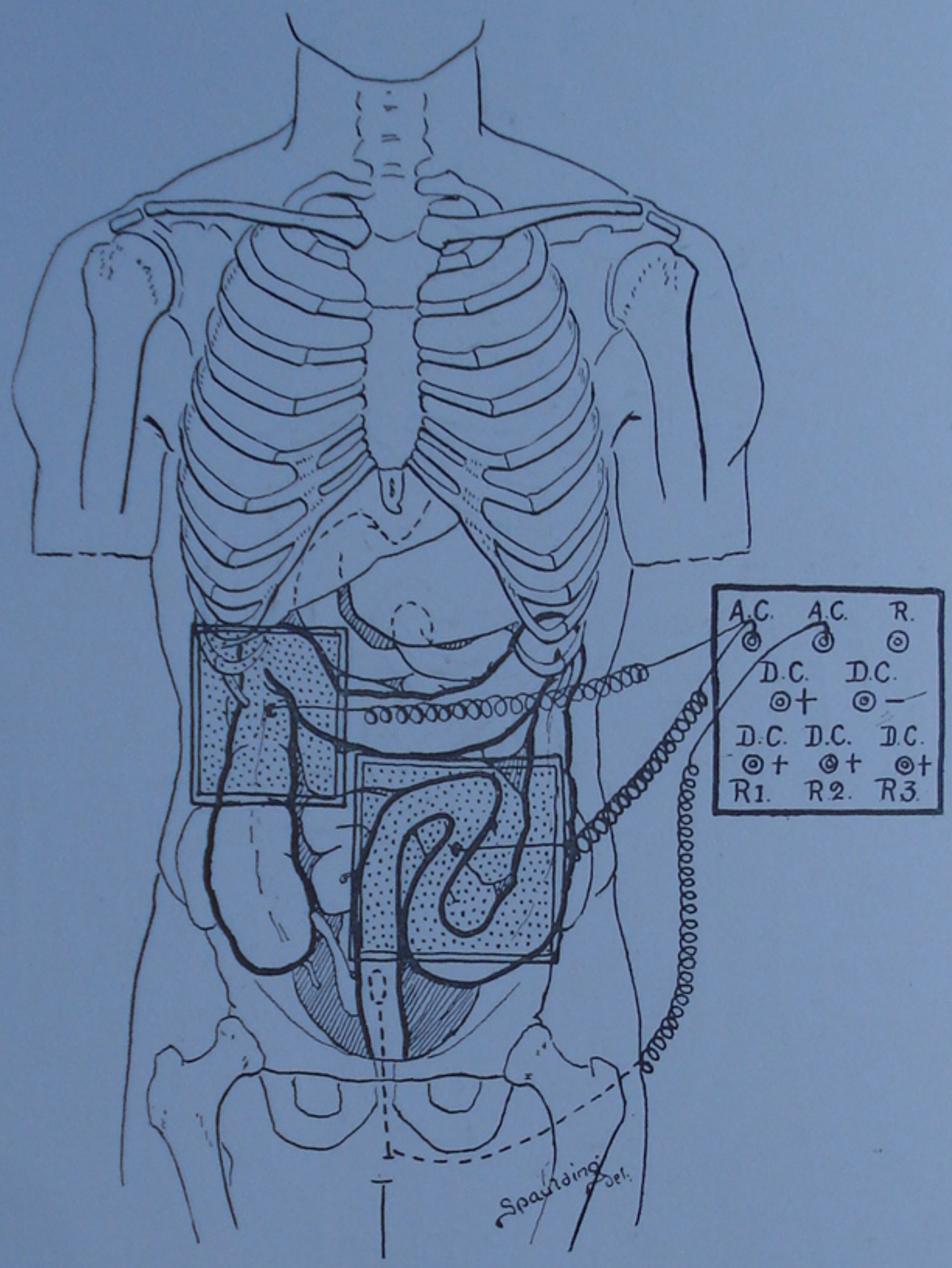
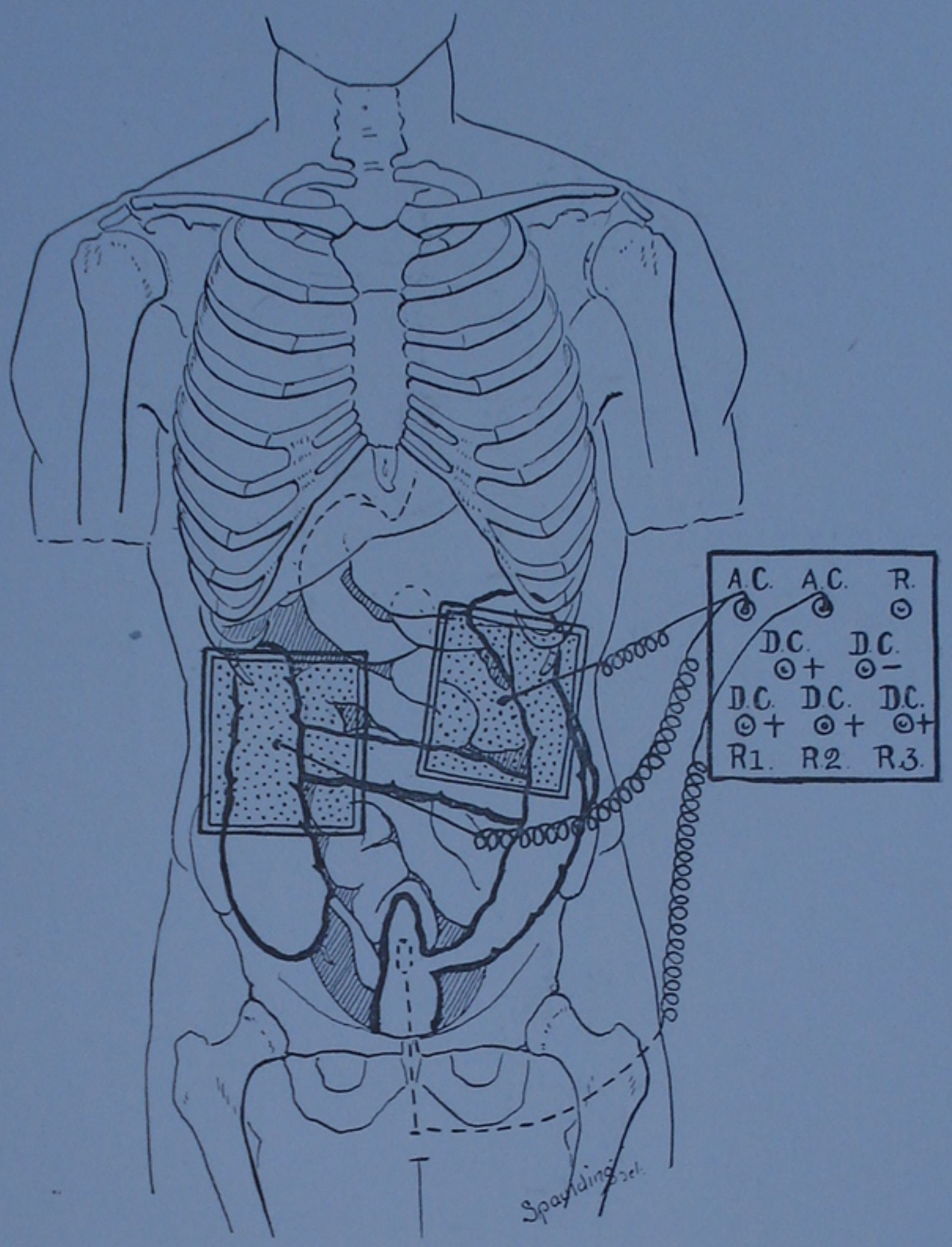


Figure 12 shows a sharp kink at the Hepatic Flexure, a much distended Caecum, prolapsus of the Transverse Colon, and Constipation. The reader will observe two surface electrodes on the Abdomen with a bi-furcated cord, also a rectal electrode connected with the A. C. This allows a more powerful surging effect, than if only one surface electrode were used. For patient with thin Abdominal walls and feeble expulsive action, the above is a good form of application. One of the surface electrodes, however, could be placed on the back and the other over the Hepatic Flexure if desired.

Fig. 13



This figure shows a marked prolapsus of the Transverse Colon due to sharp angles at both the Hepatic and Splenic Flexures. The application should be made through the Flexures from the back, using either A. C. or D. C., current on the second resistance, according to the weakness of the abdominal muscles.

Many physicians in the treatment of Intestinal Stasis are using water or some medicated solution as the internal electrode. The use of soft water greatly enhances the solvent action on the Toxins within reach.

Fig. 14

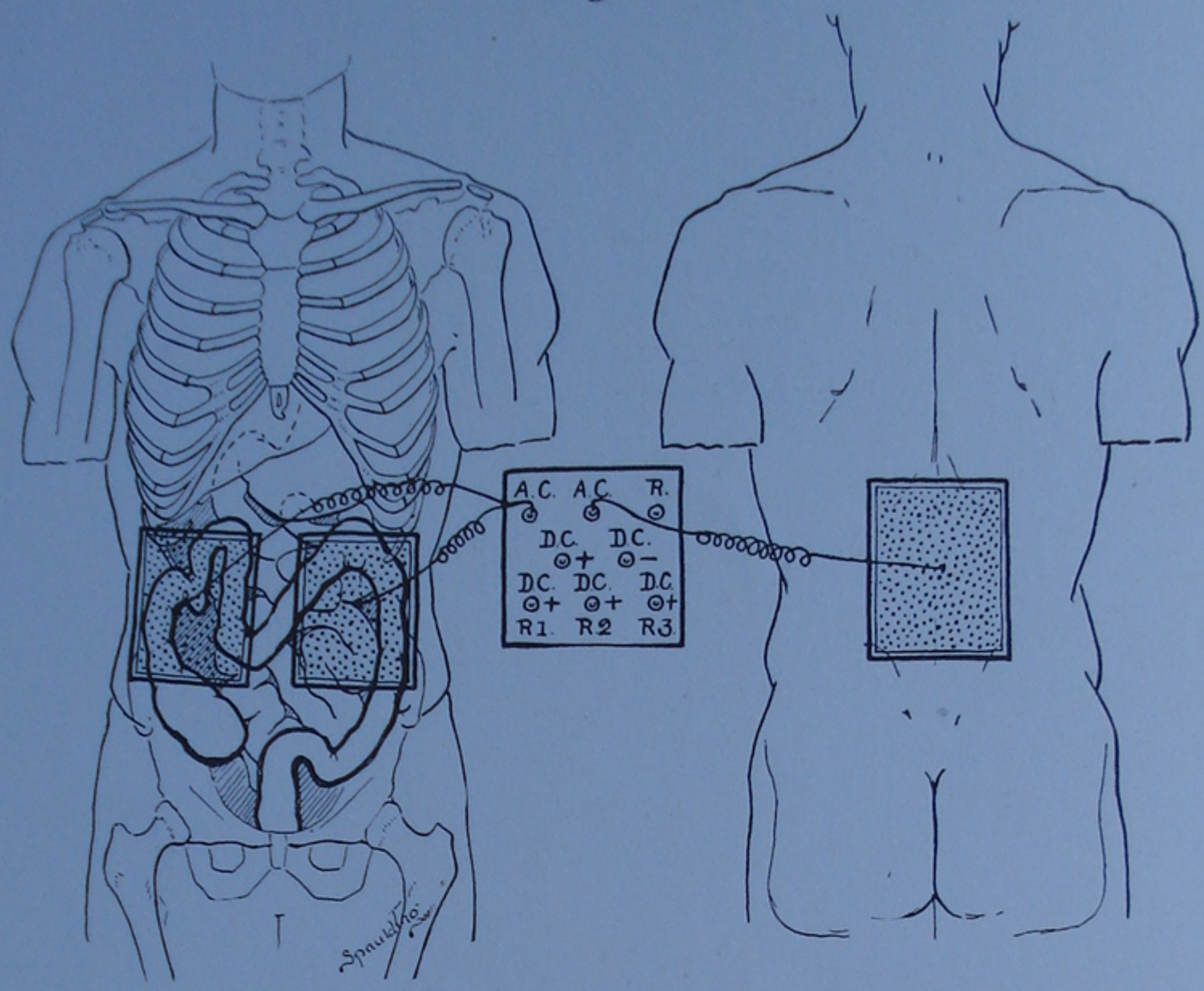

A.C. A.C. R.
D.C. D.C.
+ −
D.C. D.C. D.C.
+ + +
R1 R2 R3
Spaulding

Fig. 15

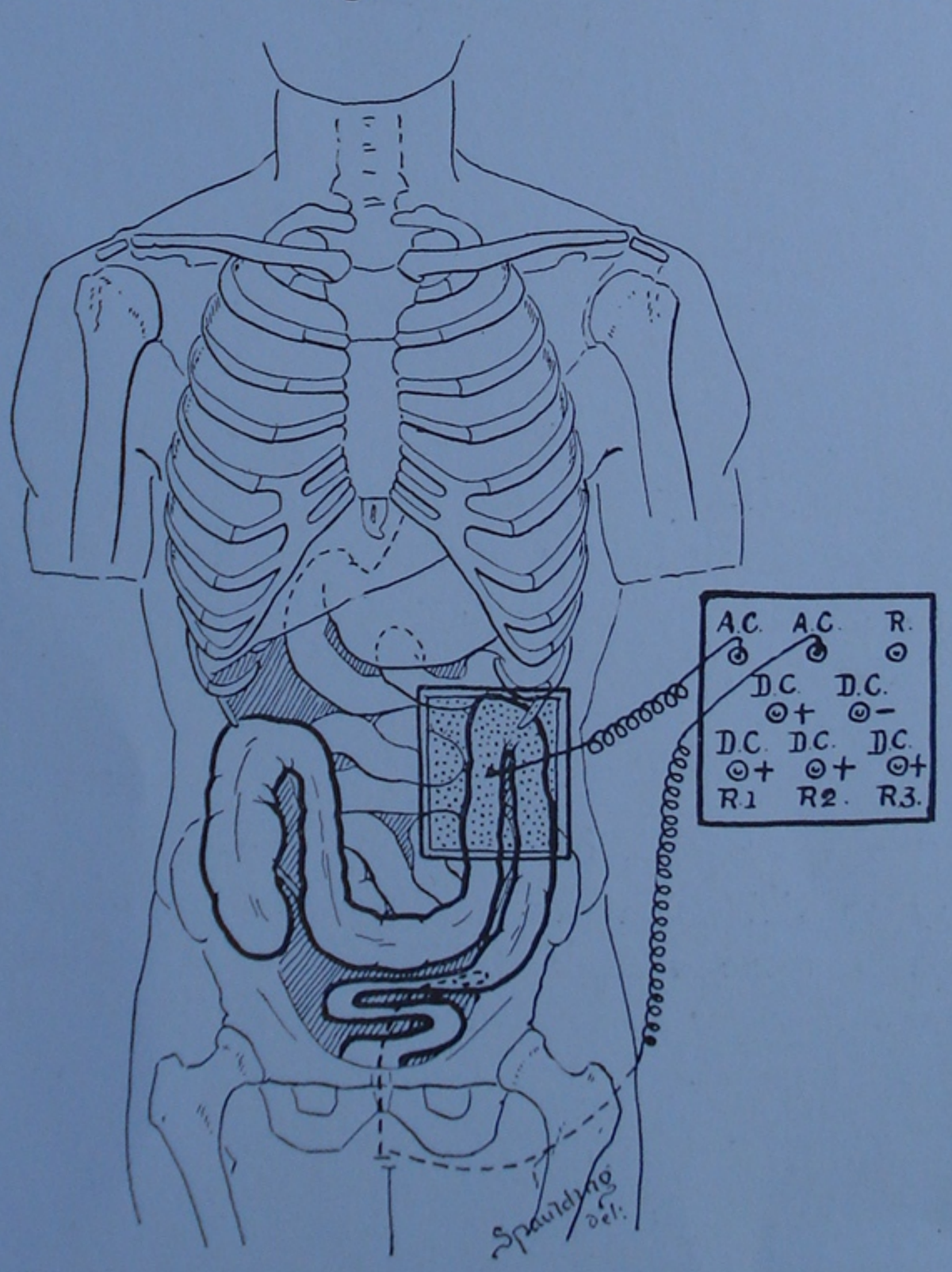

A.C. A.C. R.
D.C. D.C.
+ −
D.C. D.C. D.C.
+ + +
R1 R2 R3
Spaulding del.

Fig. 16

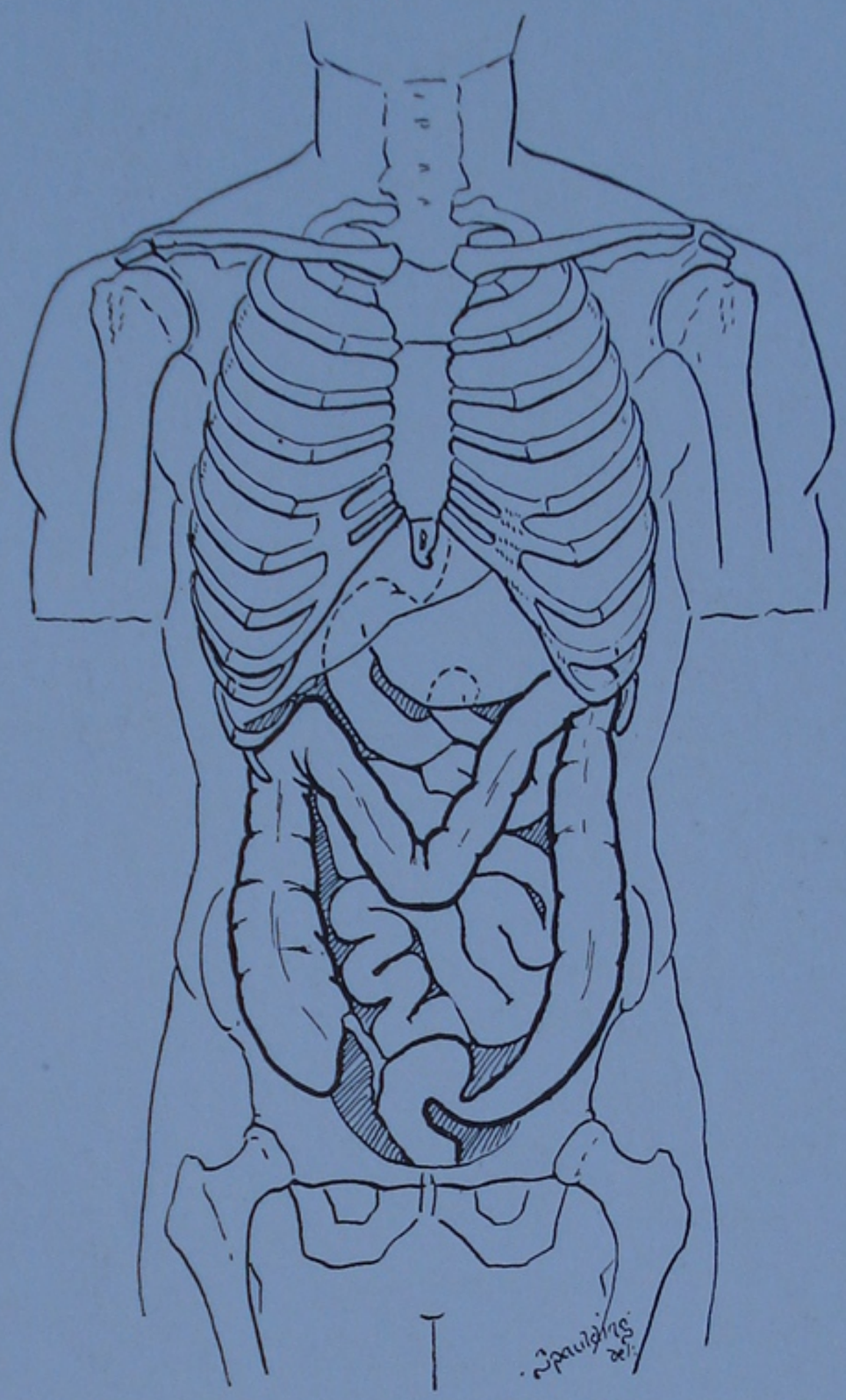
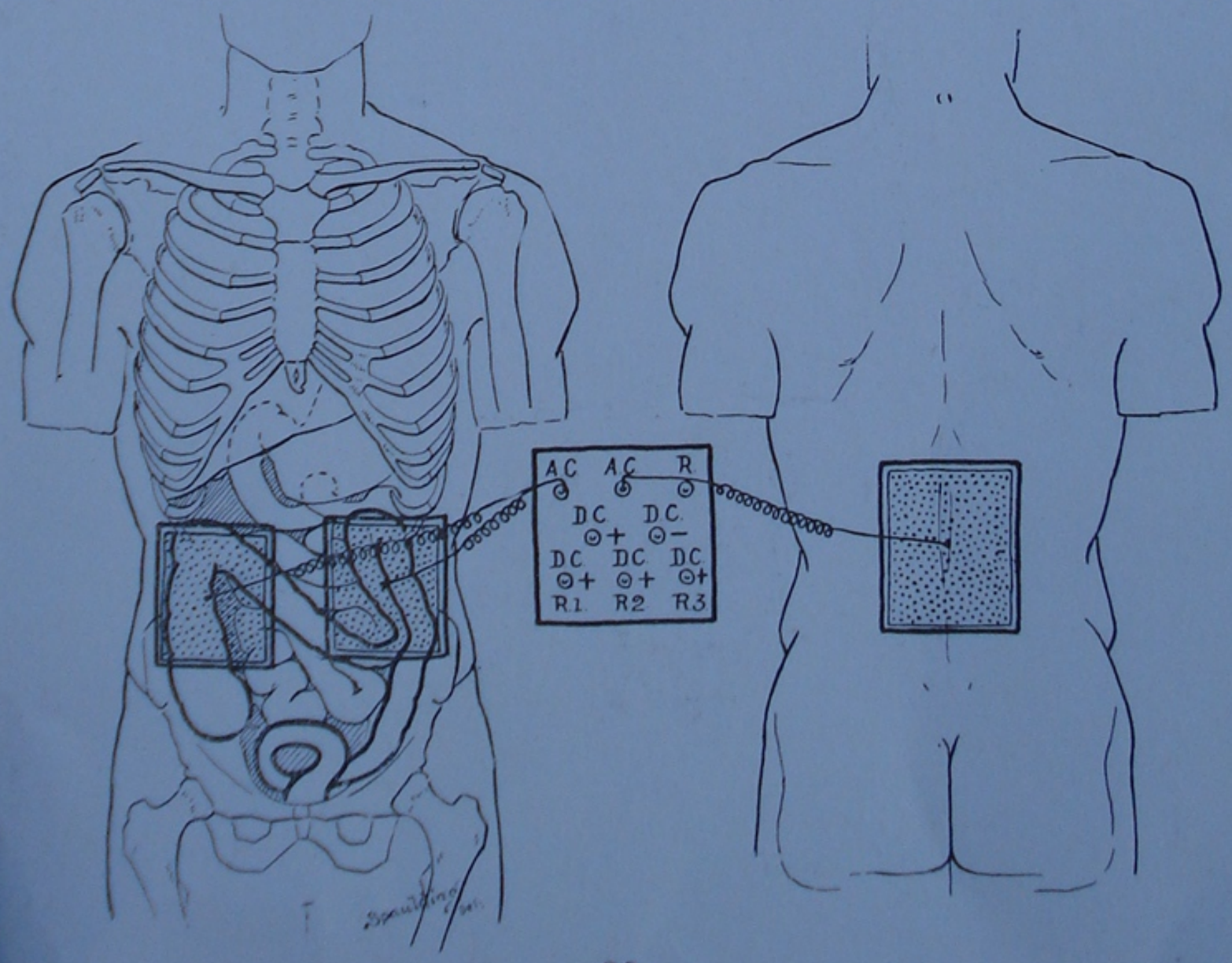


Fig. 17



Figures 14-15-16 and 17 show a reproduction of actual cases that have been under treatment for Intestinal Stasis with Constipation, and which have been very much relieved or completely cured. The same general treatment, already described, will apply to these cases. These figures are fair representations of colonic angulations which still further show the many features of this most troublesome complaint. The diagnosis for successful treatment in restoring tone, curing Constipation, etc., as has been described, will apply to these cuts.

The frequency of applications must depend upon the chronicity of the case and the age of the patient; the more chronic and stubborn the case, the more frequent the treatments should be. Chronic cases should be treated on an average of three times per week, while for less severe cases two treatments a week would be sufficient. Gradually lessen the seances as the results become evident. It is well to remember that in a well-marked case of Intestinal Toxaemia, if the poison be liberated too rapidly, absorption will be likely to ensue, and a temporary reaction in the form of Infectious Headache, or possibly some joint disturbance, may occur. Here again good judgment must play its part.

Fig. 18



Patient: Woman 55 years of age.

This radiogram, taken Nov. 14, 1920, shows marked prolapsus of all parts of the Colon, insufficiency of the Ilio-Caecal Valve, well-defined Diverticulitis of the Descending Colon, and Sigmoid Impaction.

Fig. 18A



Radiogram of the same patient as Fig. 18, taken Dec. 11, 1920, after sixteen treatments from the Morse Wave Generator using cams No. 3 and 4. The result is obvious, showing increased Peristalsis, rounding out of the curves, and relief of existing Constipation. General condition of the patient is much improved. Patient returned later for treatment of the Sigmoid Impaction, using the Morse Sigmoid Electrode and Generator, with the alternating current.

Fig. 19

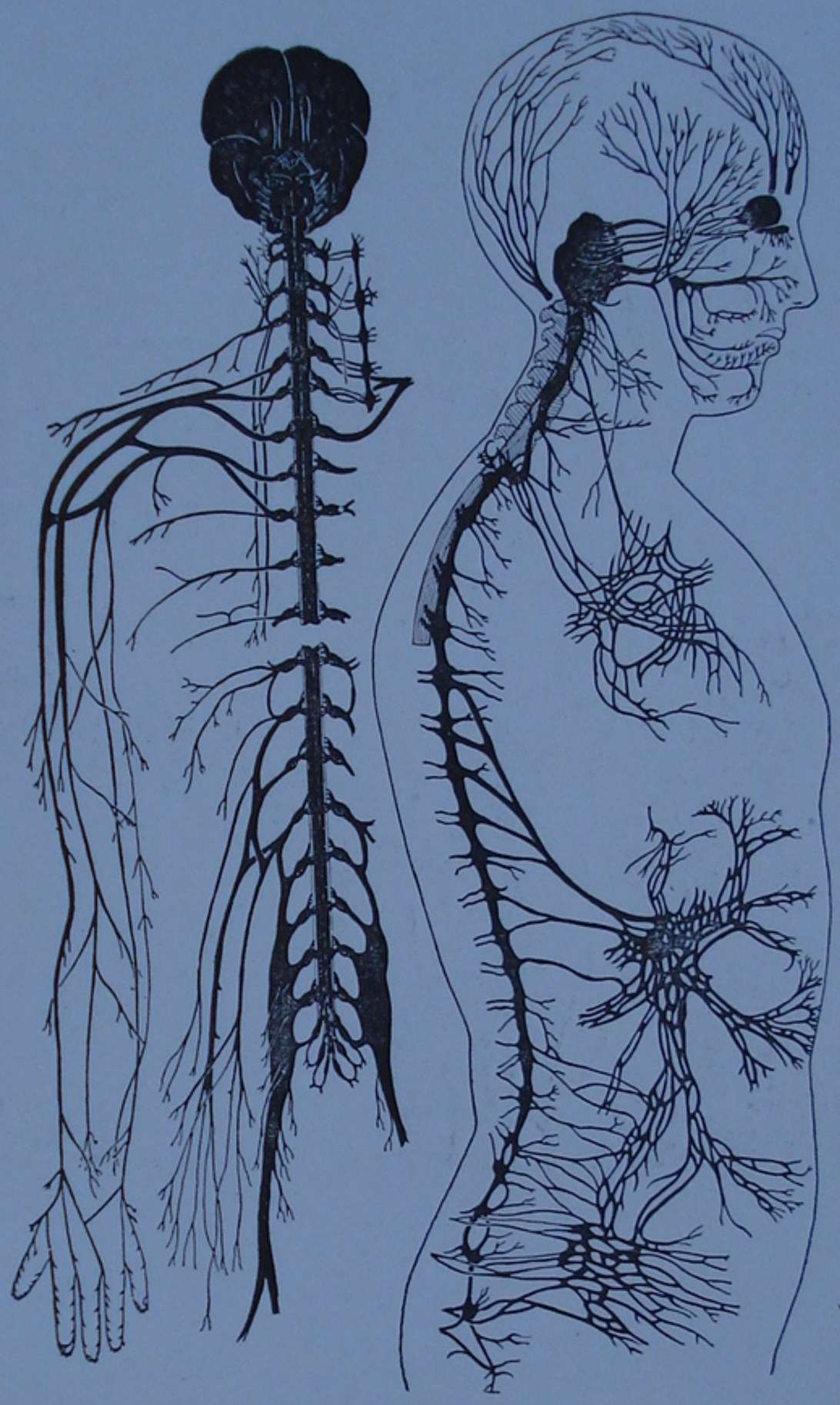
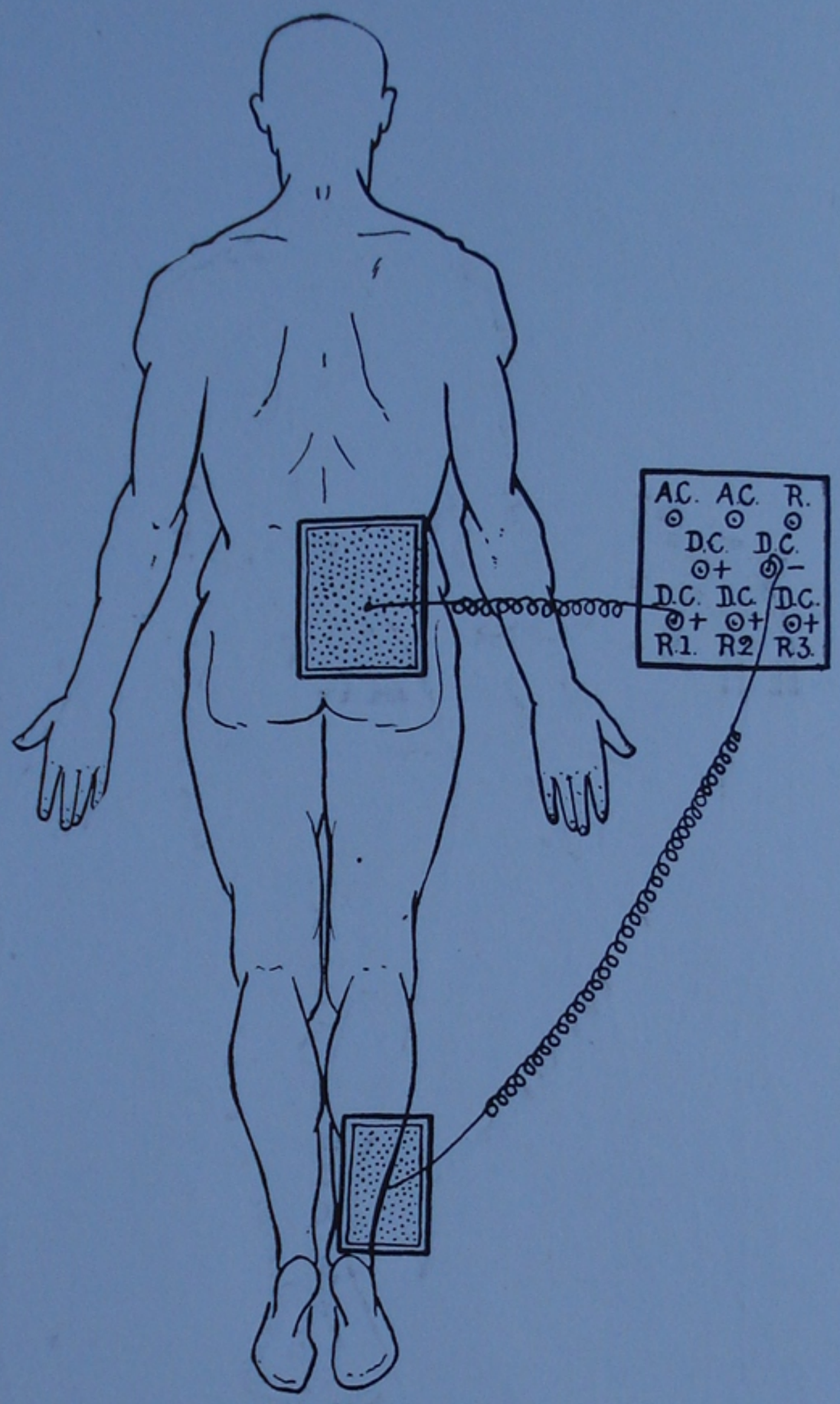


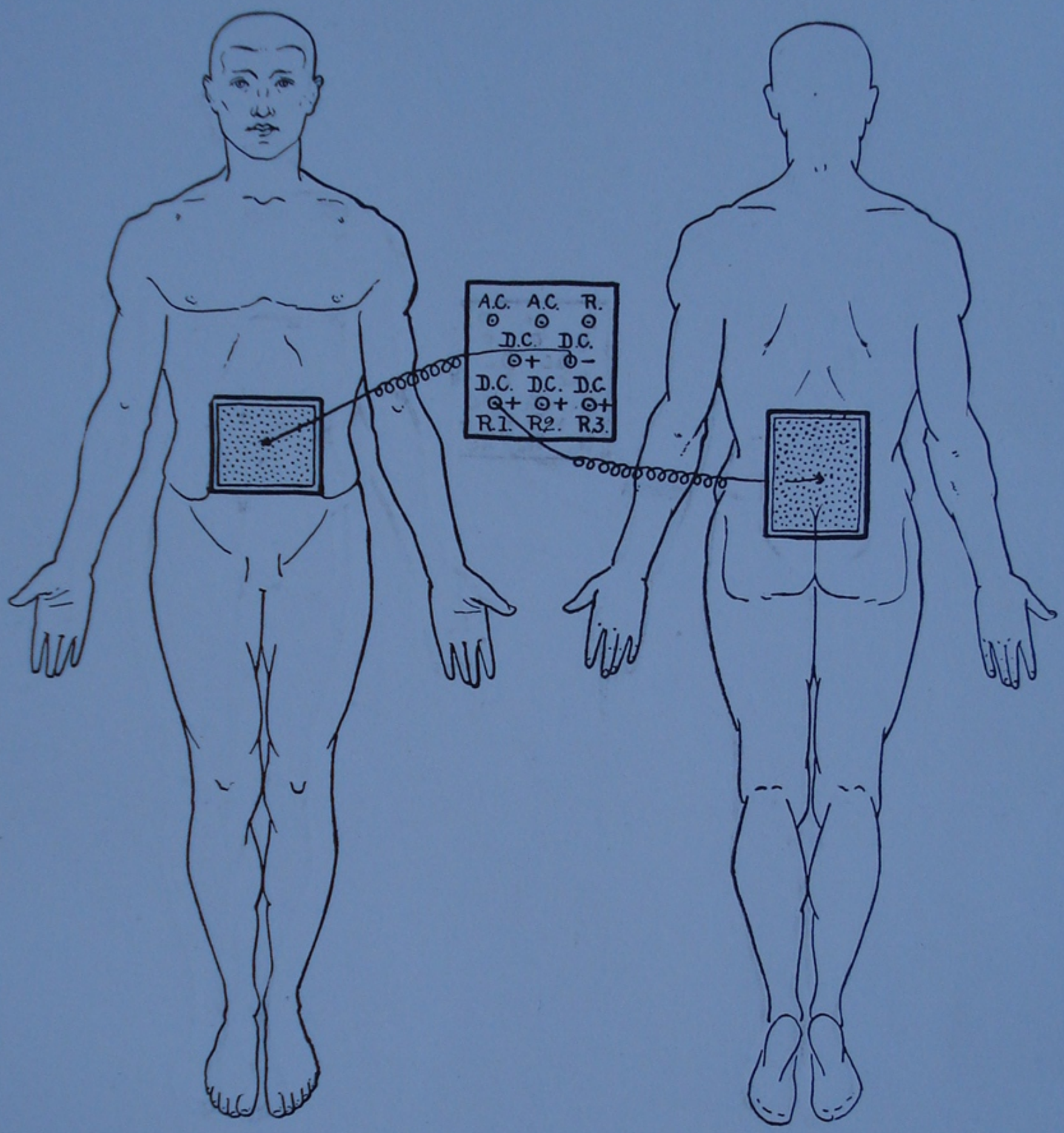
Fig. 19 represents the Spinal Nervous System, knowledge of which is so essential in making a diagnosis and outlining the technique of application, as well as in explaining to patients the cause of their painful and nervous symptoms.

Fig. 20



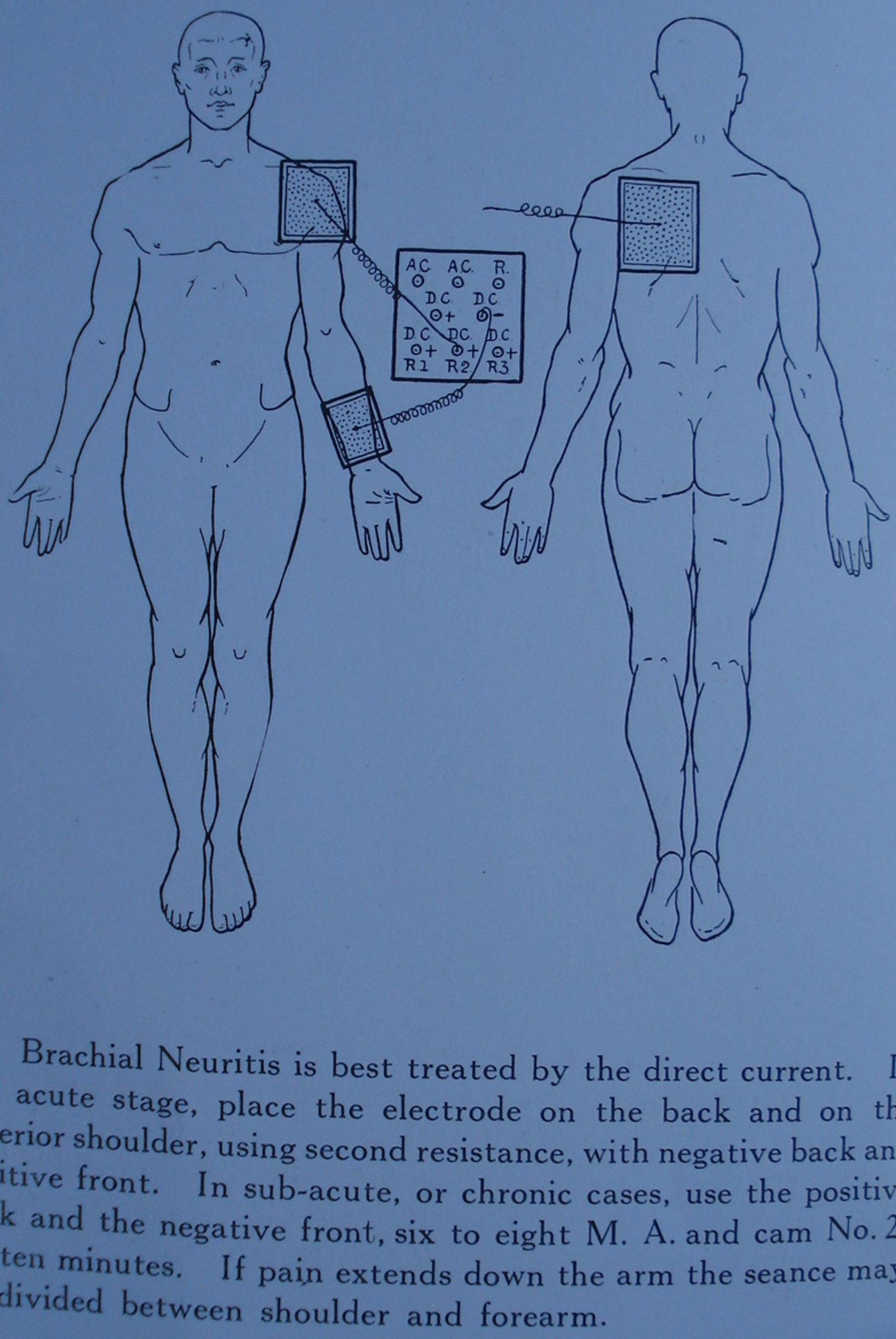
Sciatic Neuritis is a condition which, if the history of injury to nerve is not known to be otherwise, is usually caused by Intestinal Stasis, either in the Caecum or Sigmoid. While the cause should be treated as outlined for those conditions, the treatment of the immediate pain from the back to the ankle is most effective when the direct current is used, as outlined in figure 20, using ten to fifteen M. A., for ten minutes.

Fig. 21



Lumbago (Lumbar Neuritis) is most quickly relieved by using the direct current, with a large electrode over the painful area, from the positive side of the Generator, No. 1 Cam and the first resistance. A larger electrode should be placed on the Abdomen, using about ten M. A. for ten minutes.

Fig. 22



Brachial Neuritis is best treated by the direct current. In the acute stage, place the electrode on the back and on the anterior shoulder, using second resistance, with negative back and positive front. In sub-acute, or chronic cases, use the positive back and the negative front, six to eight M. A. and cam No. 2: for ten minutes. If pain extends down the arm the seance may be divided between shoulder and forearm.

Fig. 23

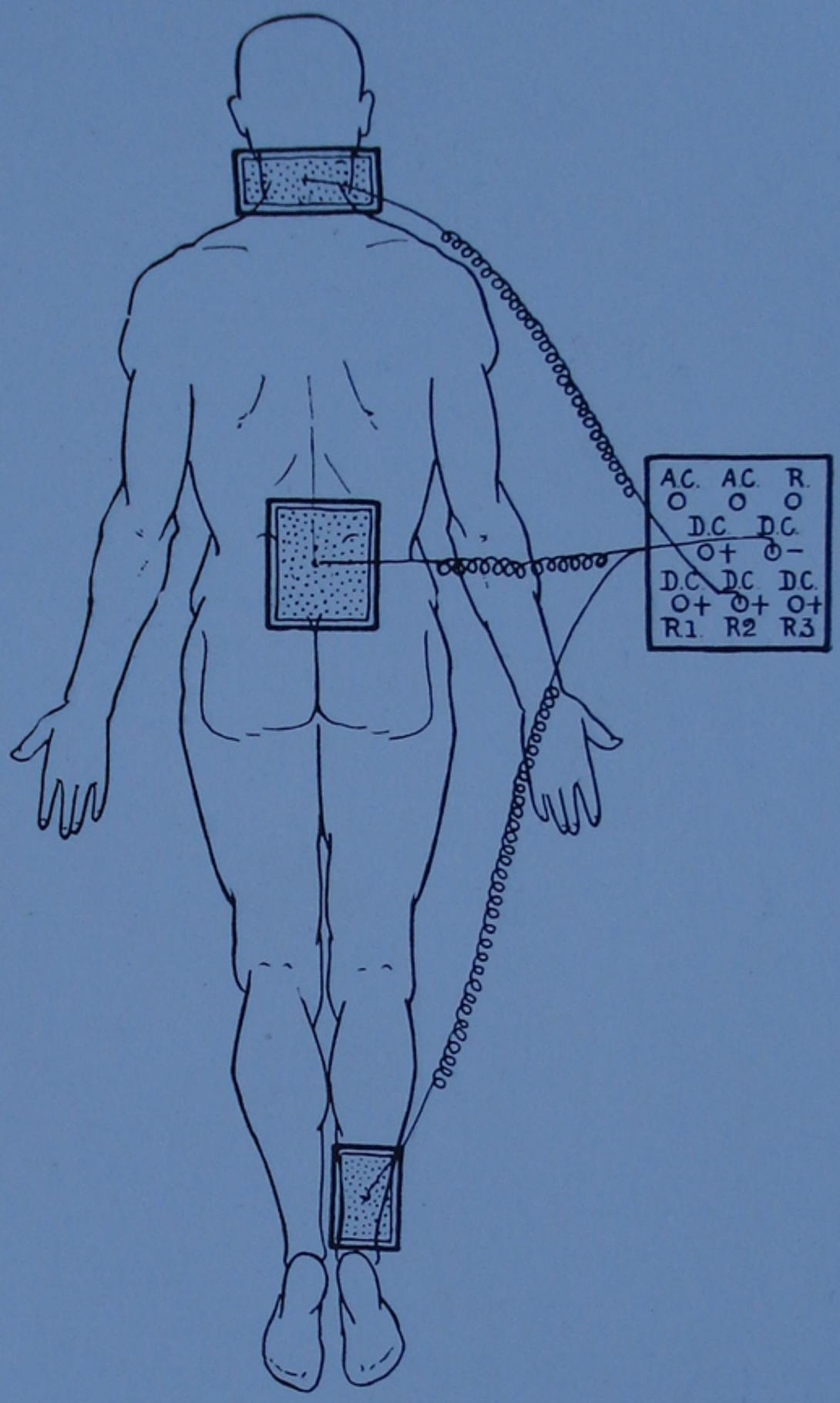
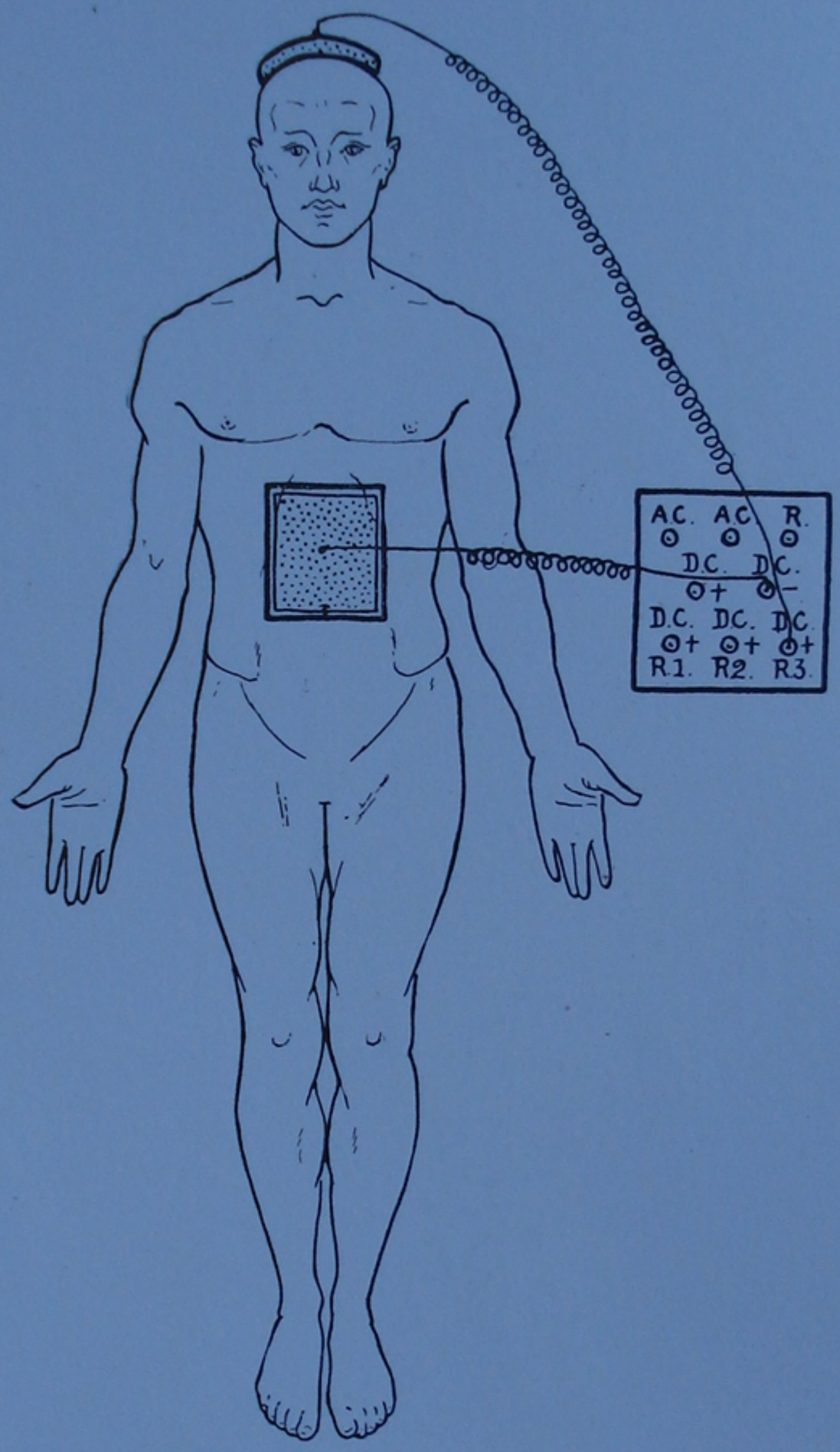


Fig. 23 and 24

Cerebral Congestion, which so often accompanies sleeplessness, hysteria, high blood pressure, or reflex, may come from the liver, Intestinal disturbances, and other causes. Use the neck electrode at the Occiput, from positive pole, resistance second or third, and not over three M. A., and the other electrode may be placed over the Solar Plexus, Back or Ankle, the first is usually chosen.

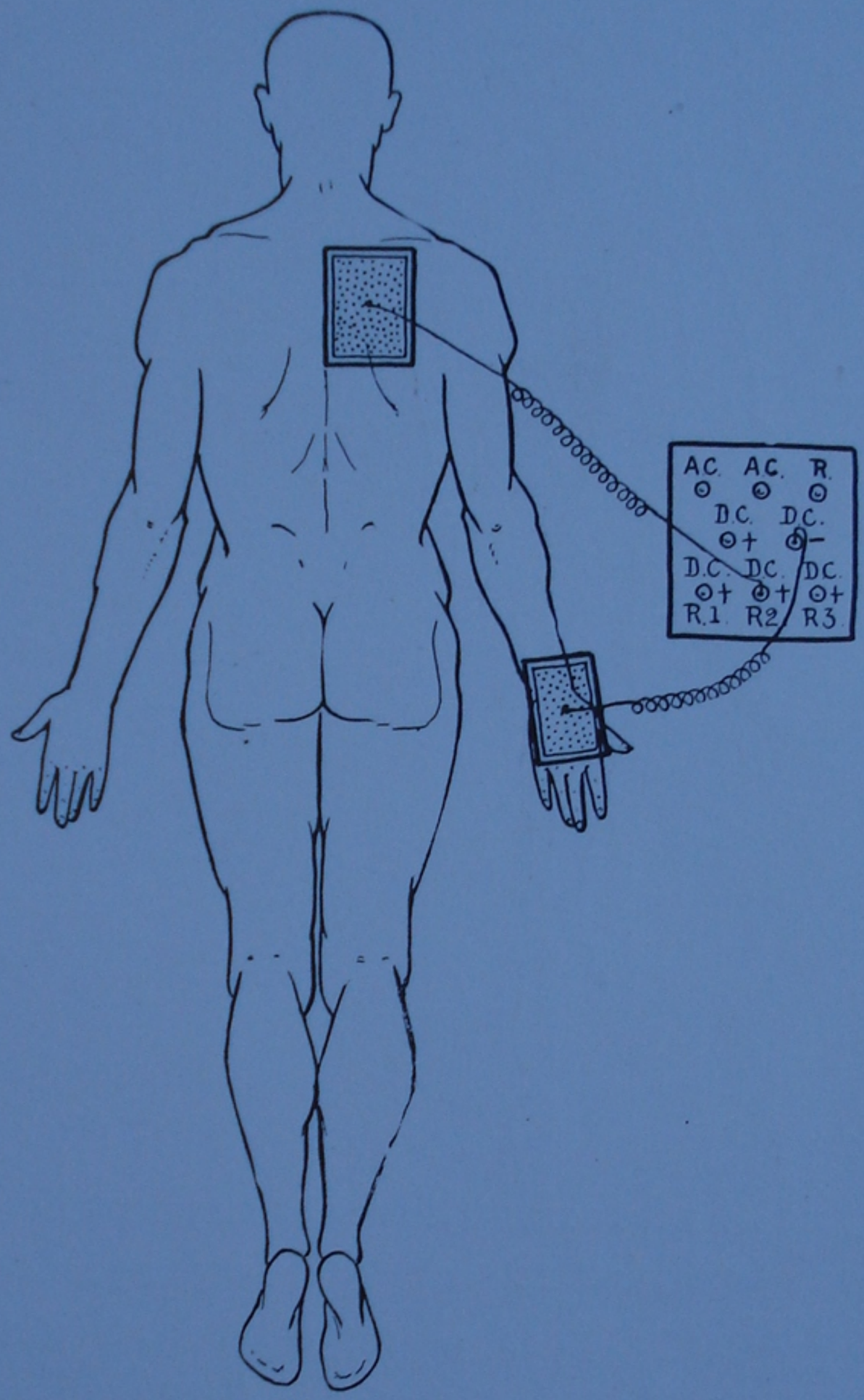
The above treatment will apply to the majority of cases of headaches.

Fig. 24



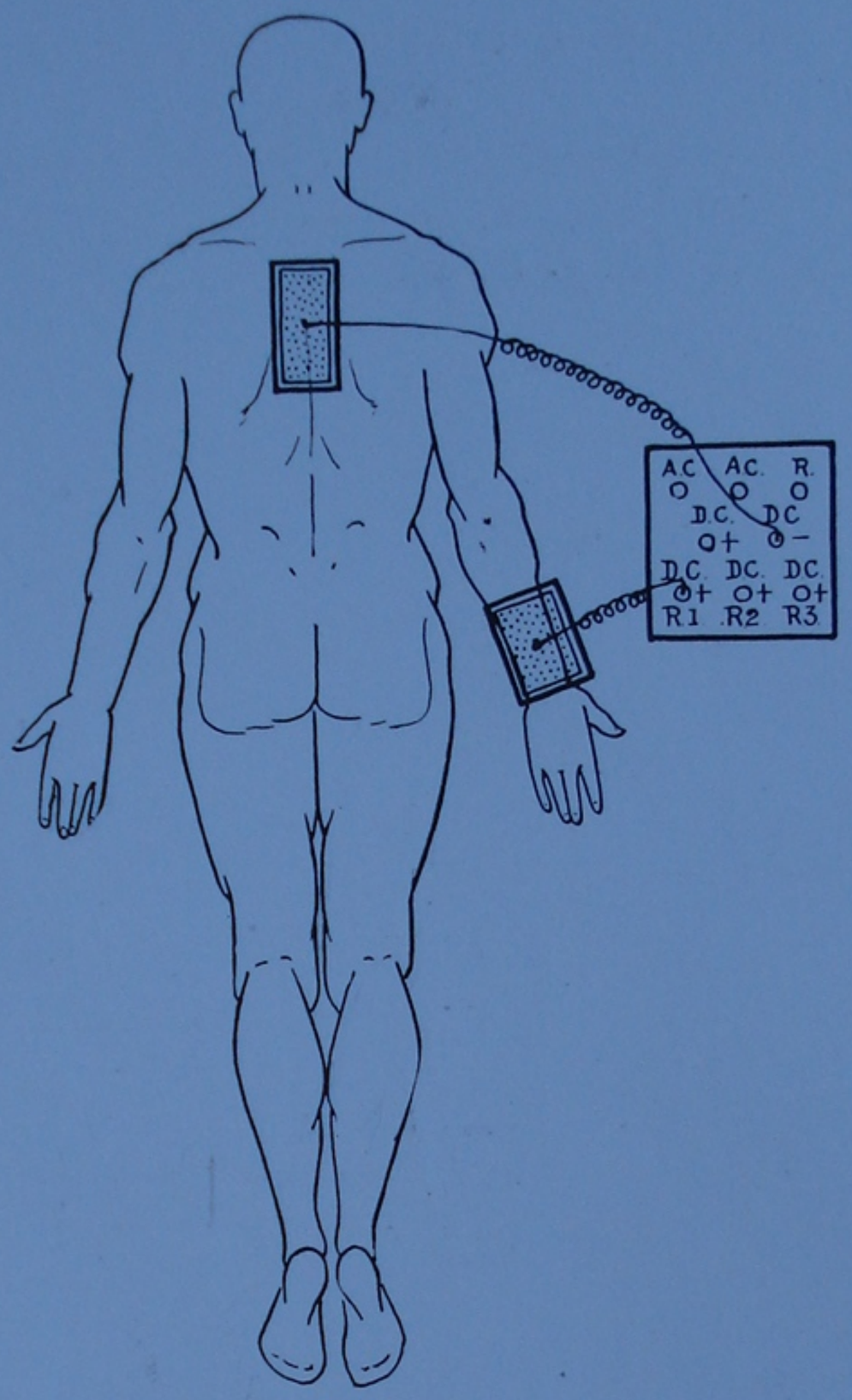
If the whole head needs treatment, as is advised in Migraine or Super-Orbital pain, moisten the scalp thoroughly and interpose a flat sponge, absorbent cotton, chamois, or some other flexible material that would act as a good conductor and conform to the head better than the flat electrode. Use two or three M. A. from positive pole for five to ten minutes.

Fig. 25



Neuritis of the entire arm should be treated in the same manner as Sciatic Neuritis, but with less current used, because the resistance in the arm is less than in the leg. Use from the positive pole over the nerve supply in the back, and the negative at the wrist, with about eight M. A. for ten minutes.

Fig. 26



In Paralysis of all forms the treatment to be used depends upon the degree to which the nerve injury has advanced. The current should always pass through the affected muscle, or muscles, lengthwise, not transversely. A safe rule to follow is,—place one electrode over the spinal nerve supply controlling the muscles under consideration, and the other beyond, or to the extremity of the disability.

For instance, for paralysis of the arm, whatever the cause, place an electrode on the back, as in Figure 26 over the sixth to eighth dorsal vertabrae, with the other in the palm of the hand, or on the wrist, using the positive pole at the spinal nerve exit in the acute and painful cases.

In chronic cases apply the negative pole to the Spine. Follow the same procedure in treating Paralysis of the leg. The amount of current should be from five to fifteen M. A., if the direct current is used and if the alternating current, turn to the

point of easy toleration. It is undesirable to have a paralyzed muscle under direct stimulation from either current over ten minutes, as a rule, because fatigue of that part might ensue from over-stimulation.

The average paralyzed area is most benefited by using No. 1 Cam, for the first part of the treatment. When the surging effect is desired use the cam that will most nearly produce the normal action of the muscle.

Fig. 27

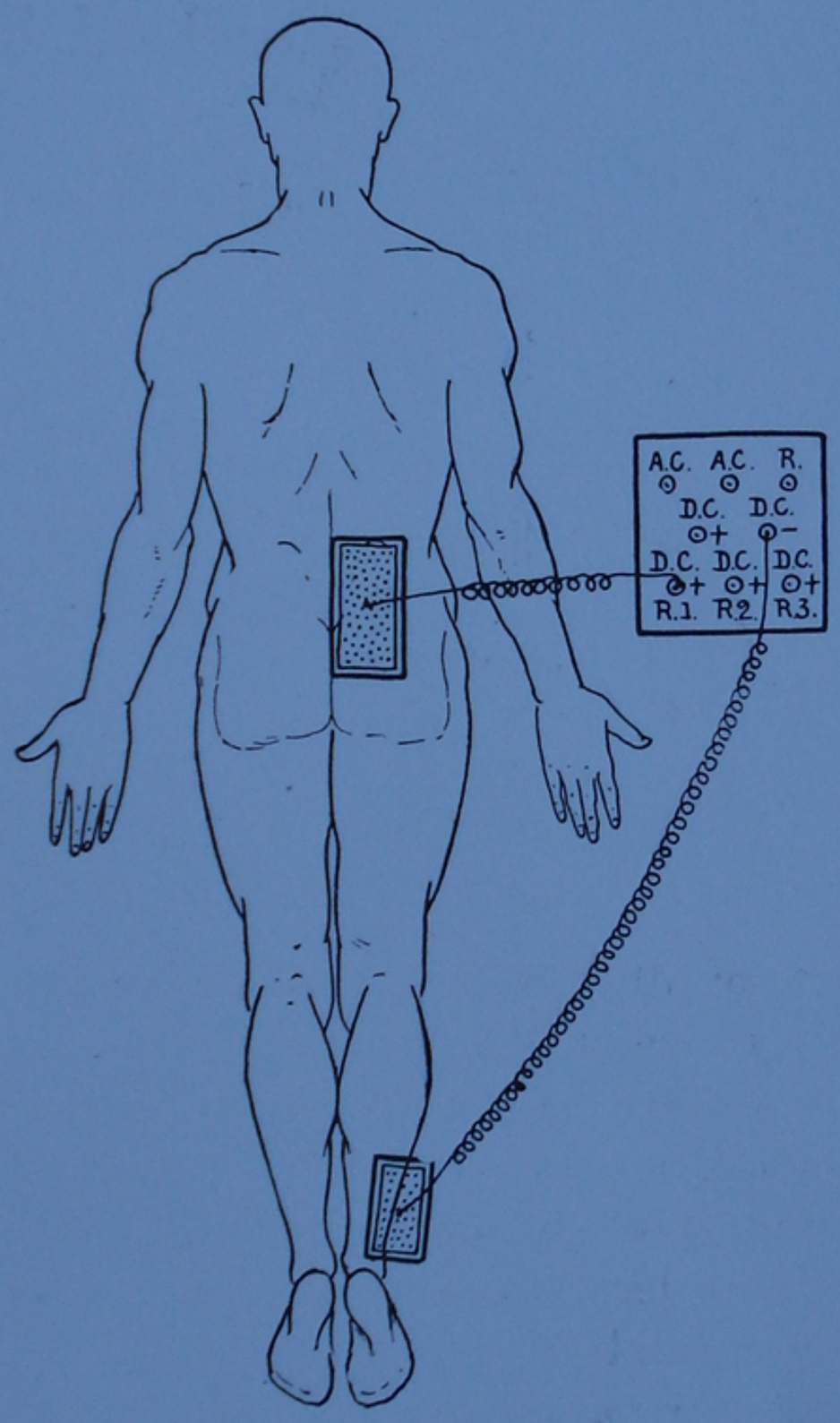


Fig. 27 and 28

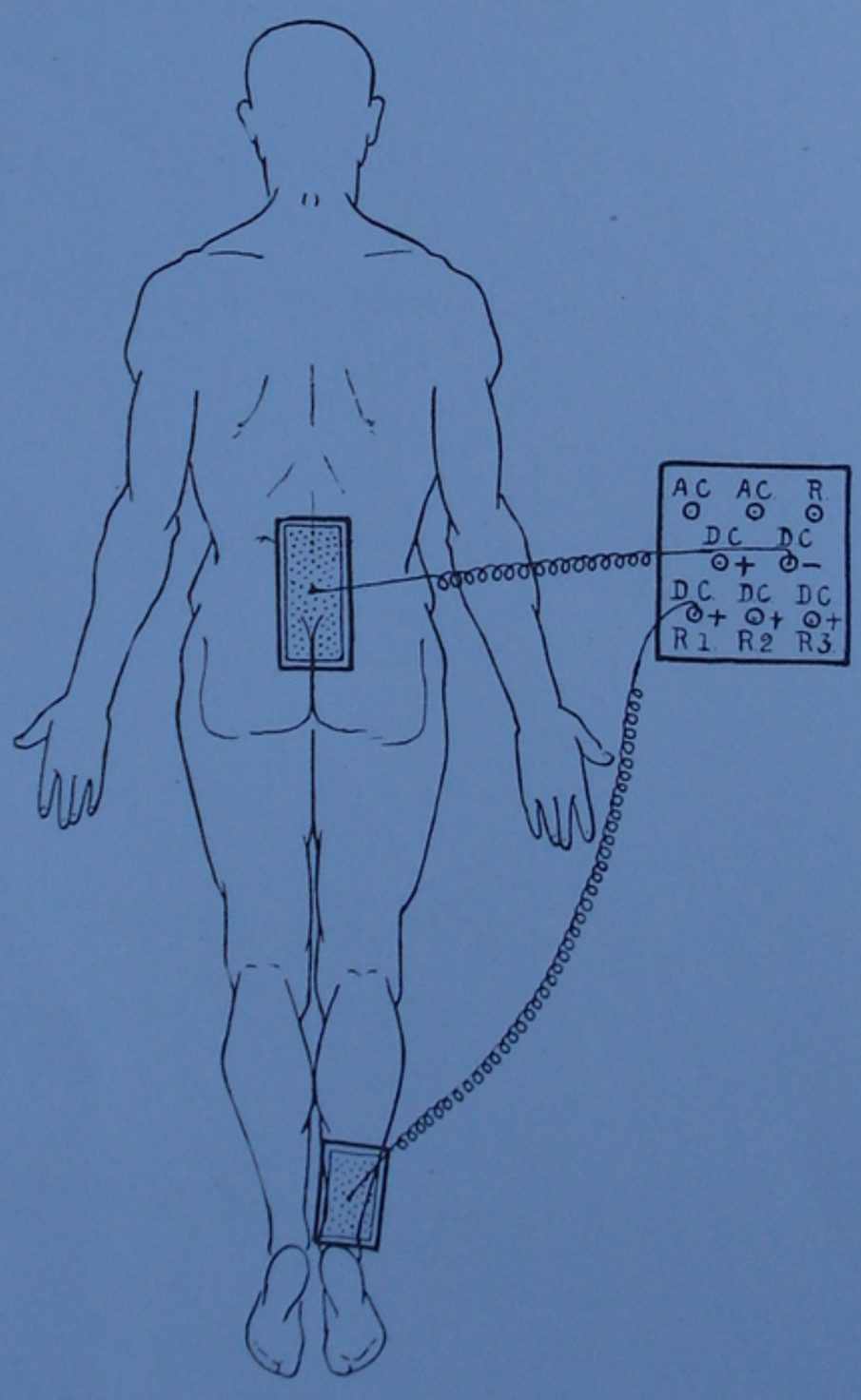
Infantile Paralysis, after the acute stage is past, is more quickly relieved, and cured, in curable cases, by electricity than by any other known method. Use the negative electrode on the Spine with the other electrode at the wrist, from five to eight minutes, eight M. A. In leg Paralysis, apply the spinal

electrode to the lumbar region and ankle, follow this with the alternating current surge, using No. 2 cam for arms, and No. 5 for legs.

Locomotor Ataxia is a disease in which degenerative changes are taking place in the posterior roots of the Spinal cord.

The object of treatment is to improve the nutrition at the immediate deep-seated affected area. The negative pole with the spinal electrode placed as described in treating Infantile Paralysis should be used, but a stronger current should be used in treating this disease than in Infantile Paralysis and other spinal affections.

Fig. 28



The following cuts show Cavity Electrodes, the use of which have been previously described.

Many and various shaped electrodes for the Eye, Ear, Nose and Throat, as well as very small ones for local nerve or muscle application, especially adapted for the Generator, are obtainable in the market, but this book is for instruction, and only those electrodes or devices are shown that are absolutely essential to explain the meaning of the text.

Inter Uterine



Carbon Ball



Oblong Copper Ball



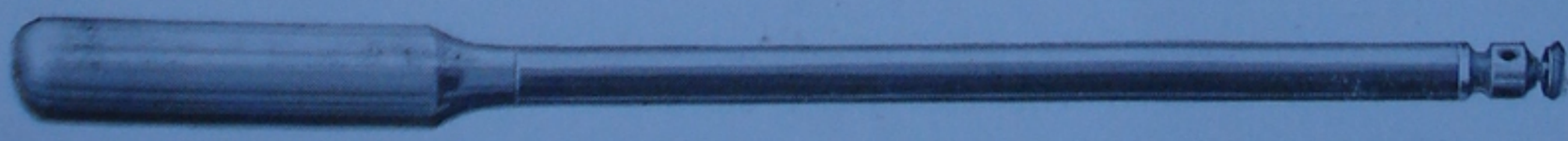
Sigmoid



Prostatic



Vaginal



Bifurcated Cord



SUGGESTIONS

1 It should be unnecessary to remind the reader that the same antiseptic precautions must be taken with all the surface electrodes as with any other applications to the surface of the body. The Morse Surface Electrodes may be rendered practically sterile by steaming or scrubbing with soap and hot water.

2. A bi-furcated cord can be used for saving time when either arms or legs apparently need the same application, by placing a large electrode on the back and two smaller ones on the wrists or ankles. The same principal applies to Vaginal and Rectal treatments.

RULES

1—Remember, that there are motor points (Nerve Exits) all over the human body, and that electrical susceptibility is greater over that immediate area. (See books on Electro-physiology).

2—Remember, that a sensation may be felt anywhere along the course of a nerve, no matter where the source of irritation exists. This applies to electrodes placed indiscriminately on the body.

3—Remember, that direct, constant and galvanic current are synonymous terms that you may not get confused when reading the literature on the subject.

4—Remember, that the direct current has, unlike any other, the power of heating the part through which it passes and its action is not confined wholly to the poles.

5—Remember, with the direct current that there is obtained at the positive pole a contractile, pain-relieving, haemostatic, anti-congestive action, and at the negative, a congestive, irritating, hemorrhagic effect is produced.

6—Remember, that mild currents invigorate and strong currents depress vital tissue. Therefore, in the application, if the seance is too prolonged or too strong, harm as well as benefit might ensue.

7—Remember, that during the application of either the direct or alternating current, your patients are receiving more muscular gymnastics, deeper-seated elimination, and the galvanic current in a pleasanter form than you ever saw administered before.

DONT'S

1—In using the Morse Wave Generator do not expect the milliampere meter needle to move when using the alternating current. The volt meter needle may or may not move according to the resistance in circuit. Movement is of no consequence with the alternating current.

2—Do not turn the direct current on or off a patient suddenly. Do not turn the alternating current on suddenly, but there are no objections to turning it off suddenly.

3—Do not allow the Generator to run with the door open and a Cam in place, as it is the closed door that keeps the Cam secure. Should a Cam fall off while the Generator is in motion, some part of the apparatus might be broken.

4—Do not move electrodes of any kind, or shape, externally or internally, with the current in action. This applies more especially to the direct current, when a nerve exit might be touched, producing painful contractions. Moving electrodes about on the surface indicates that one is not sure of their pathology and may actually harm their patient.

5—Do not fail to have surface electrodes thoroughly saturated to the metal conductor under the rubber back. This is more essential with the direct than with the alternating current. A wet surface does not always mean deep saturation.

6—Do not put surface electrodes over bony prominences when it can be avoided, but if necessary make it conform to the part.

7—Do not fail to have absolute contact of electrodes wherever used. Not only will this insure better results but add to the patient's comfort. Sandbags, cushions at the back, bandages or towels pinned tighly over the electrodes on the extremities will improve the contact.

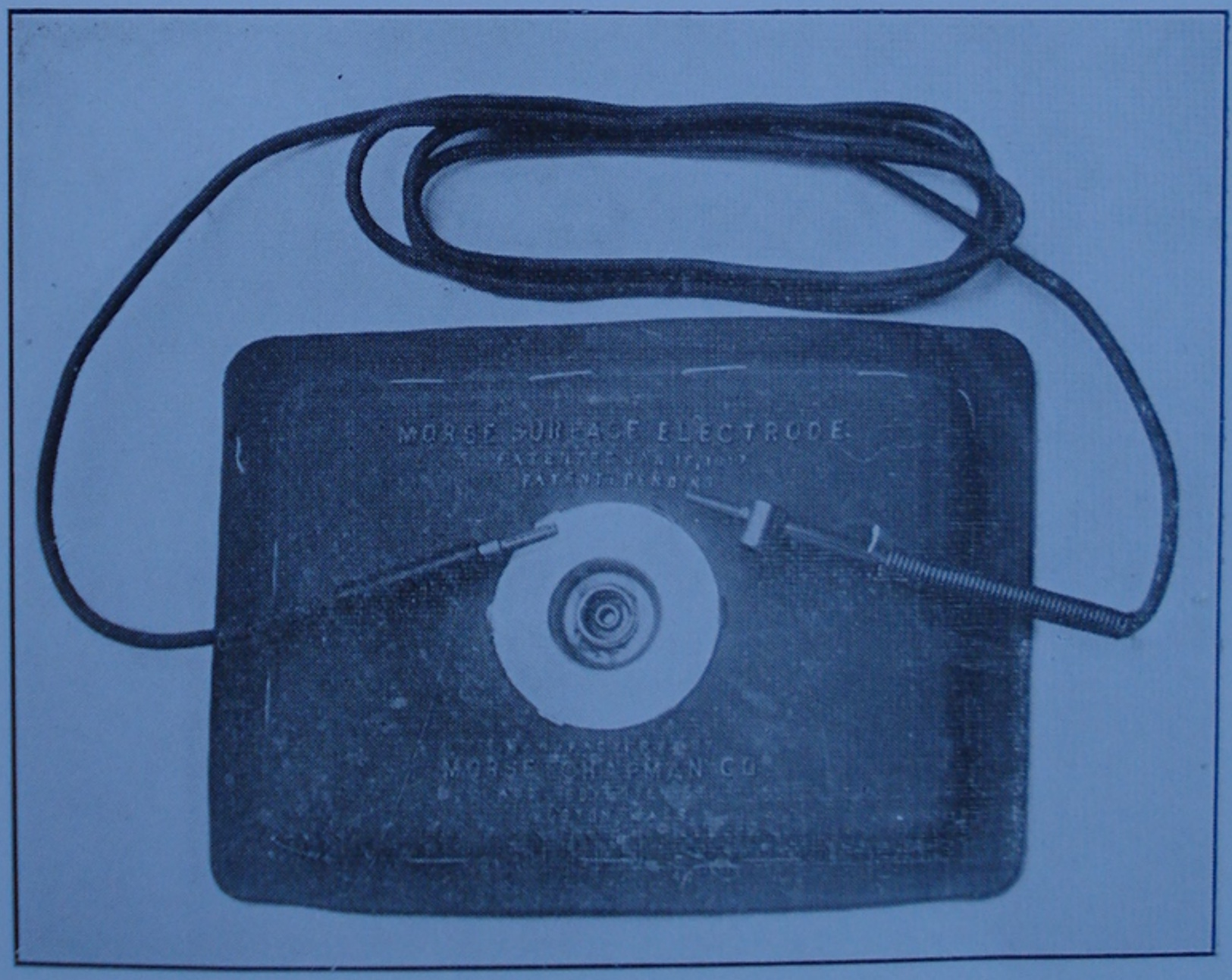
8—Do not allow the metal part of an electrode or metal tip to touch a patient. Should this happen the A. C. would give an unpleasant sensation, and the D. C. a possible burn, which if caused by the negative pole would be slow to heal.

9—Do not attempt to remove a copper or zinc electrode after the treatment is finished, until you are sure it is sufficiently loosened from its position.

Many other diseases and conditions might be mentioned and detail of treatment described and illustrated but why weary the reader if the general principles which govern the use of the methods used, have been plainly set forth. The frequency of applications, the length of seances, the size and shape of electrodes used must depend upon individual cases, requiring at times much tact and judgment. Therefore, if the perusal of this book has furnished its readers a more comprehensive knowledge for the treatment of diseases in which the usual forms of medication are frequently unsatisfactory, then the writer's mission is fulfilled.

MORSE SURFACE ELECTRODE

The New Model of the Morse Moist Surface Electrode is composed of an asbestos compound for conduction, a moulded pure rubber back for protection, and a locking device on a cord tip on the electrode, so that accidental detachment is impossible. It is considered by experts to be the best moist conductor ever devised for the purpose. Made in various sizes.



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In Harvey C. Whelden

With best wishes

Fred L. Gross

Boston Nov 22nd 29.

THE GALVANIC CURRENT
AND
LOW VOLTAGE WAVE CURRENTS
IN
PHYSICAL THERAPY

PRINTED IN THE UNITED STATES OF AMERICA

THE FALCON PRESS
Publishers
36 India Street
BOSTON, MASS., U. S. A.

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by
Frederick H. Morse, M. D.

GALVANIC CURRENTS
AND
LOW VOLTAGE WAVE CURRENTS
IN
PHYSICAL THERAPY

BY

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FOREWORD

This Book is written so that the busy practitioner of medicine who has little time to peruse exhaustive medical literature, or experiment in new fields, may be enlightened quickly.

A little concentrated study into the basic principles of the direct current in order that the "**why**" may be understood and the "**how**" simplified.

It has been considered unnecessary and superfluous to have a display and description of apparatus in this book. Such information is easily obtainable from manufacturers, or their representatives when desired. Knowledge of the necessary apparatus for the production of electric currents is indispensable for the operator, but in the nature of the instruction contained herein it would have a strong tendency to detract from and confuse the reader whose object is to readily absorb the writers' ideas on the fundamentals, and apply his therapeutics to his apparatus at hand, or what he might obtain.

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PART I

GALVANISM

No. 1



No. 2



Two diagrams (shown on opposite page) representing as described in the text in chapter 5, page 25 the local polar affects on the skin of the galvanic current. The area about the needle at the positive pole shows a condition of anemia, and at the negative pole hyperemia. The diagram No. 2 represents the two forms of burns that may be produced by metal contact on the skin by the galvanic current. It is observed that at the positive pole the eschar is contractile in its outline, and of a grayish color illustrating its haemostatic effect. At the negative pole there is produced under the same condition as in the description of the positive pole action a hyperemia in and about what appears to be a soft ulcer.

THE GALVANIC CURRENT AND LOW VOLTAGE WAVE CURRENTS IN PHYSICAL THERAPY

The increasing use of high frequency electric currents in medicine and surgery has caused many medical men to begin the use of these powers in their practice without familiarizing themselves with the low voltage currents. This is to be regretted, not only because of the loss of valuable agencies for relief, but because a comprehension of the low volt direct or galvanic current is essential to an understanding of all forms of electric energy. It is electric force in its simplest, rudimental form; a stream of electrons from the negative pole passing through a conductor like a stream of water through a pipe, carrying energy for transformation into useful work at any point desired. It is this energy, transformed in differing ways outside or inside the body, that produces all the methods of electrotherapeutics.

Besides this fundamental relationship to all electric methods, or modes of employing electric energy in medicine and surgery, the direct current, called galvanic by medical men, has been used by physicians for a hundred years as a remedial agent, its scientific study covering more than half this time, beginning with the German clinicians and teachers Remak and Erb, who established clinical facts of present importance when chemical primary batteries were the only source of the energy, and units of measurements, as well as means of accurate measurements, had not been devised. The works of Remak, Erb and Von Ziemssen, and of the English authors, Althaus, Poore, Steavenson and Sir Lewis Jones are today valuable mines of clinical information on galvanic surgery in particular, despite the fact that the

currents employed by the earlier of these writers were measured by the number of cells used, milliamperes and meters not having yet been devised. The clinical material of a medical character is less valuable, chiefly because of the indifferent diagnoses of the day.

The other forms of low voltage electric energy, the low voltage wave currents, deserve the special attention of medical men because apparatus for the stimulation of the contractile organs of the body in wave periods suitable to each is now available; these generators, moreover, being power driven, may be set for treatments of durations more likely to produce results than laborious hand applications.

To these uses of low volt currents—galvanosurgery and power wave stimulation — should be added the indicated uses of the chemical effects of the galvanic current, including displacement of body ions and diffusion of certain drugs to moderate distances beneath electrodes.

The following statement of the rudimental physics of low voltage electric currents in such a conductor as the human body is intended for physicians who are rusty in their medical physics, or who graduated before such studies were required. Those who are familiar with these interesting premedical studies may turn at once to their clinical applications; but no physician can prescribe or apply intelligently this physical force in medicine without a knowledge of the basic laws governing it.

CHAPTER I

THE GALVANIC OR DIRECT CURRENT

Why Electricity Flows in a Current—Conduction of Electric Current—How Electricity Flows in a Conductor—Electric Pressure or Voltage—Mode of Producing Sufficient Pressure in a Galvanic Current—The Unit of Pressure: The Volt—Resistance—The Unit of Resistance—The Ohm—Table of Specific Resistance—Volume of Amperage of an Electric Current—The Unit of Volume, the Ampere—Importance of Shape and Duration of a Wave—Wave Frequency in Low Voltage Currents.

The galvanic current is a unindirectional current of electrons, that is, a current of electrons passing in one direction through a conductor, hence the name of *direct current* by which it is known to physicists. It was first discovered by Luigi Galvani, an Italian physician in the famous frog's leg phenomena hence the name still used by physicians, but early physicists more properly called it after the Italian physicist Volta, who corrected Galvani's misconception of the need of living muscle and nerve for its production, and first produced it from a battery made of alternate discs of copper and zinc with discs of cloth moistened with salt water between them.

The name galvanic will nevertheless persist as a term for the medical direct current, not only because of long usage but because it means *a direct current of the milliamperage useful in surgical or medical practice*, and with *a voltage only sufficient to carry the desired milliamperage through the human tissues.*

The galvanic current may be best understood by comparing it with a water current flowing steadily through a pipe. Power is available from either current when its kinetic or motion energy is transformed into some other form of power by a suitable

mechanism, this mechanism causing the change by interposing resistance to the flow. The water current, impinging on the resistance vanes of a wheel, turn it, and its energy is thus changed to another form. The electric current turns a wheel also when its energy is first transformed into magnetism and then into motion.

Why Electricity Flows in a Current.—Water flows in a current down hill because of the gravitational attraction of the earth, the energy developed, when the current is confined during transit being available for transformation into other forms of power.

Electricity flows also "down hill," from the negative pole (cathode) in a generator at which it has been heaped up by some force (whether a dynamo, chemical action in a primary or secondary cell, or inductive force) to the deficient condition at the positive pole (anode) or to the earth.

Both currents may be made to do work during the flow.

Conduction of Electric Current.—A water current is best conveyed or conducted, with its power, through a pipe with a smooth inner surface and of sufficient caliber to carry the required volume, both qualifications of the pipe indicating a minimum of frictional resistance.

An electric current is best conveyed through a wire composed of the metal molecules presenting least "specific resistance", (copper, silver, etc.) and of a caliber to carry sufficient volume.

How Electricity Flows in a Conductor.—Physicists have now apparently determined that all matter is made of electricity, an atom in repose being made up of a minute space of confined power in which a number of the smallest divisions of electricity —electrons—revolve around a central proton, similar to the solar system, the number of the electrons determining the nature of the atom. An electric current is a flow of the less firmly

attached electrons from atom to atom along a conductor, propelled by the presence of an excess at one point to a point where there is a deficiency.

The *mode of flow through a solid* conductor, such as a wire, is that given in the previous paragraph, that of electrons from atom to atom.

The *mode of flow through a watery liquid* conductor is very different from that through a metal. To begin with, water, if absolutely pure, will not conduct electricity, and its impurities, solids in solution, are not in sufficiently close contact to conduct electrons from atom to atom. But if the dissolved substance be a *binary compound*, that is, a molecule composed of two ions with opposite charges—a deficiency charge or an excess charge of electrons—an electric charge in excess of one and one half volts will overcharge an ion in a molecule, causing it to rotate and pass its excess electrons to the opposite ion of the next molecule, which by similar rotation passes its defficiency backwards, thus resulting in a forward progression of power.

This fact, that electric conduction within liquids is accomplished by chemical interchanges in binary molecules in solution, is important to physicians, for the body may be regarded as a complex solution of binary and other compounds which undergo chemical changes during the transmission of the current—changes that persist for some time when the galvanic current is used, but for exceedingly brief intervals when the current is alternating.

Electric Pressure or Voltage.—It was pointed out in a previous paragraph that a stream of electrons, an electric current, flowed "down hill" from the cathode because power had been heaped up at that point, just as water flows through a pipe from an elevated source in a reservoir, This analogy between force stored and conveyed by hydraulic currents and force stored and conveyed by electric currents may well be pursued further, for the laws of power transmission in stored and

flowing energy are really similar for all kinds of currents, and are more easily presented to our senses by the water current.

The best electrical analogy to the water current from a raised reservoir is the storage cell. This is a true reservoir of electric force that has been pumped into it. It is a low voltage reservoir of electricity. A condenser is the only other true reservoir of electricity, but one only available in practice for high voltage charges.

The storage cell consists essentially of two sets of lead plates immersed in weak sulphuric acid, each set connected with a single terminal. The plates are arranged for the greatest surface exposure to each other without those connected to opposite terminals being permitted to touch. If a direct current (or the direct waves of a rectified alternating current), is pumped in at one terminal a portion of it becomes stored in the form of lead salts on the surface of the plates and in the acid solution, the energy being heaped up in the molecules in so unstable a form that they pour it out in the form of a current in an opposite direction as soon as a path is opened through a conductor, the solution and plates then reverting more or less into their condition before charging. The energy or power was stored in chemical form.

A primary cell, on the contrary, actually generates electric current, so far as energy can be generated by anything under the general law of the conservation of force.

The primary cell generates or releases electricity held in chemical form in binary compounds in aqueous solution and in metals because of the peculiar electric relation of two metals to each other. All metals are positive or negative to each other in varying degrees. Of the list, the greatest difference exists between carbon and zinc.

When a plate of carbon and a plate of zinc are immersed in an electrolyte, (an aqueous solution of a binary compound), and

their unimmersed parts connected by a conductor, their immersed surfaces have opposite electric charges which, in the case of these two metals, are far enough apart to attract opposite ions from the solution, setting up an electrolytic action that releases electric charges stored in the chemicals, water and zinc plate, the charges pouring out as an electric current at the zinc cathode through a conductor and back in to the carbon anode as long as the path exists, until the charges stored in the electrolyte and zinc are exhausted by storage into some other forms of chemicals, now practically debris, and the current slows up or entirely ceases until the cell is recharged.

The dynamo, of both the direct current and alternating current variety, is also a true generator of electricity, under the limitations of the conservation of energy law referred to, for it extracts from the power that turns the armature the electric current in the field of the magnets, the magnetic field itself being either produced by the power applied or by that residing in permanent magnets.

MODE OF PRODUCING SUFFICIENT PRESSURE IN A GALVANIC CURRENT

A water current flowing "down hill" in a confined channel, such as a pipe, flows with an intensity or velocity proportional to the difference in level between the intake and outlet of the pipe. This difference in level rise to *pressure*, which is directly proportional to the height of the intake above the outlet. A reservoir of water forty feet high will give twice the pressure in a pipe leading to the ground as will a reservoir twenty feet high.

An electric current must also have pressure to do work, particularly to force a passage through the poorly conducting cuticle of the human body. The current of a primary cell, it has been stated, has the pressure of the difference in potential between carbon and zinc, or 1½ volts. Enlarging the plates of the cell will not increase this pressure, (though it will lessen

internal resistance), for in the end we have only the pressure inherent in a single pair of plates of these metals. The only way to increase the pressure of a current from cells is to arrange them *in series* in a battery as follows: the carbon of the first cell is connected by a wire with the zinc of the second, the carbon of the second with the zinc of the third, and so on, the unconnected first zinc becoming the negative pole or cathode of the battery, designated by the minus—sign, and the final carbon terminal becoming the positive pole or anode, designated by the plus + sign. As the pressure of each primary cell is one and a half volts the combined pressures at the poles of such a primary battery of, say, twenty-four cells will be thirty-six volts.

The pressure obtainable from a secondary or storage cell, no matter what its size, is about two volts, increased pressure being obtained as in primary cells by arranging them in series in a battery, the combined pressure being about double the number of cells in the battery or forty-eight volts for a storage battery of twenty-four cells.

The pressure of a current from a dynamo is determined by its windings and speed of revolutions.

The Unit of Pressure: The Volt.—The unit of electromotive force or pressure measurement is the volt. This is the pressure difference between the metals zinc and copper, and was adopted because the Daniel cell, a zinc and copper cell, a cell popular with the physicists at the time the unit was adopted, gave this pressure, and was a cell that could be constructed in an exact and standard form.

Resistance.—Force of any kind cannot manifest itself except by exertion to overcome resistance.

A stored force, as water in a reservoir, would not remain stored but for stoutly resisting walls. It would not carry power in a pipe unless the sides of the pipe were strong enough to resist the pressure.

A pipe line also presents resistance to the delivery of water power at the outlet, this resistance being of two kinds: First, the weight of the water being propelled, and the amount of friction presented by the lining of the pipe; and, second, the diameter of the pipe and its length. The weight and friction are self evident. The resistance due to the width of the water path and to its length are also easily understood, for the use of a path must be limited by its dimensions. It follows that doubling the diameter of the pipe, (which increases its cross section area fourfold), will lessen the resistance to one fourth. The resistance due to the length of the pipe increases directly with its length—200 feet will present double the resistance of 100 feet.

An electric current meets a resistance in a wire that is specific to the metal of which it is composed, as explained below. This specific resistance of a conductor to the passage of electrons is somewhat analogous to the frictional and weight resistances of a water current. The relation of electric resistance to the width of the path of the current and to its length is exactly analogous to the same relations of the water current. One hundred feet of annunciator wire, for instance, (No. 20 Brown & Sharpe gauge) will have a resistance of about one ohm, while 200 feet will have about two ohms.

Broadening the path of an electric current by broadening its conductor will, conversely, lessen its resistance in proportion to the broader caliber of the path.

The Unit of Resistance, The Ohm.—The measurement of electric resistance was first undertaken with galvanic currents, in measuring the current flowing in a wire conductor from one of the old primary cells. The Daniel cell, with copper and zinc elements, each surrounded by a sulphate solution of its metal, has what may be called a relatively small "internal resistance" between the plates through the solution, and this was taken as the unit of resistance and named an Ohm, from a German professor and mathematician.

All generators of electric current must of course present internal resistance, though that presented by a modern dry cell is a small fraction of an ohm, and the internal resistance of storage cells and dynamos is so small as to be negligible by physicians. To "short circuit" wires from either of the latter, by allowing metal conductors to therefore touch each other, permits such a deluge of power to escape as to endanger the melting of instruments in its path. It is like breaking down the side wall of a large reservoir of water.

All substances may be divided into those that conduct electricity with greater or less ease and those that insulate it more or less. Metals are the best conductors, probably because the molecules are best adapted to carry the electronic flow, and of these copper is usually considered as presenting the least resistance to the flow, hence it is rated as I in the comparative list, though silver is a slightly better conductor. This inherent resistance of a metal is called its "specific resistance."

Table of Specific Resistances.—Resistances in ohms of the same length and diameter of wire that would present a resistance of one ohm if composed of copper:

Silver	0.77
Gold	1.38
Aluminum	2.29
Zinc	2.82
Iron	5.36
Tin	6.76
Platinum	7.35
Lead	9.96
German Silver	10.09
Antimony	18.07
Mercury	47.48
Bismuth	64.52
Graphite	1106.00
Gas-carbon	2037.00

A clear idea of the effects of the sizes of copper wire on the resistance presented by it may be gained by scanning the following table, taken from "Practical Electrotherapeutics and Diathermy" by one of the present authors. (The Macmillan Company, New York, 1924.)

Lengths of copper wire in common use required to give a resistance of One Ohm. The numbers of the wire are those of the Brown & Sharpe gauge.

No. 40	(an extremely fine wire, rarely used)	1 foot
No. 36	(the finest wire employed as conductor for ionization electrodes)	2.3 feet
No. 32	(a fine wire, of light weight, useful for conduction of most galvanic currents)	6 "
No. 28	(the heaviest wire needed as conductor attached to active electrodes)	15 "
No. 26	(useful as a more lasting conductor attached to dispersing plates)	23 "
No. 20	(employed in annunciator and bell wiring)	100 "
No. 0	(smallest trolley overhead wire)	2 miles
No. 0000	(trunk line trolley wire)	4 "

One lesson taught by the figures in this table is the small importance of the resistance of cords and wires used for conducting and applying electric currents to the human body. No. 32 is the finest wire likely to be used as an electrode connection in ordinary applications, yet six feet of it give but an ohm resistance, while the human body between electrode pads presents hundreds of ohms and three or four thousand ohms between dry plates on the skin. Fine, or small caliber wire, will therefore carry all the current required in heavy applications, and is often preferable to heavier wire for the mechanical reasons of lightness of weight, a heavy wire often tending to pull an active electrode out of position, shocking the patient. Double cotton covering affords ample insulation for low volt currents when care is observed to keep the wire from touching moist skin.

The resistance of the human body varies greatly according to the part traversed by the current and the condition of skin contacts, dryness or moisture of the skin portals being more important than the distance traversed by the current through the body. The greatest part of the body resistance is in the cuticle itself. Muscles, glands and bloodvessels are comparatively good conductors and bone poor. Disease is said to change the resistance of the affected parts. The variation due to the cuticle and its condition of dryness or moisture is shown by the following experiments:

With small, dry metal electrodes held in the palm of each dry hand the resistance may be as high as 3000 ohms. With large, moist pads placed on the abdomen and back it may be lowered to 100 or 200 ohms. With a large metal electrode in the moist vagina and large, moist dispersing pad on the abdomen it may be reduced to 80 or 100 ohms. With large puncturing electrodes, both thrust into a vascular malignant growth and thus entirely eliminating the skin, the resistance may be reduced to 20 to 40 ohms, the distance of the electrodes apart becoming important for the first time in the experiments.

Volume or Amperage of an Electric Current.—The volume of a water current delivered by a pipe is the number of gallons passing the outlet per second from its "head" or pressure through the resistance encountered.

Similarly, the volume of an electric current is the number of amperes passing the outlet of the conductor per second from its pressure through the resistance of the conductor.

The Unit of Volume, the Ampere.—The ampere, like the volt and ohm, was adopted from the Daniel cell, being the volume of current delivered by a standard cell of this type from its pressure of one volt through its internal resistance of one ohm.

The ampere is much too large for medical purposes, therefore its thousandth part, the milliampere, is the medical unit of the direct or galvanic current as well as of high frequency currents.

CHAPTER II

GALVANIC APPARATUS

Generators—Conducting Cords—Electrodes for Low Current Voltage—Active Electrodes—Surface Electrodes.

Generators.—The physician of the present day being fortunate in obtaining the galvanic current for all office applications from the modern forms of wave generator apparatus, the discussion of cell and battery generators in preceding pages has only been necessary from a historical and informative point of view. The difficulties encountered by the pioneers in this work in securing current from batteries of chemical cells undoubtedly had much to do with the limited use of the galvanic current in the recent past.

The galvanic current should be waveless for most of the purposes described in Part I of this work, and, before the development of the generators mentioned, could only be supplied by some form of cell battery or by small direct current dynamos operated by alternating current motors, the small dynamos often giving a wavy current from an insufficient number of sectors in the commutator.

These modern generators have meters to indicate the actual galvanic current traversing the patient, with a means of turning on and off the voltage needed to secure the milliamperes desired, both voltage and milliamperes being indicated by meters. The polarity of the terminals is also marked, but the correctness of this marking should be tested before using an apparatus the first time as polarity is exceedingly important in this current.

The Conducting Cords for galvanic currents and other low volt currents need less insulation than those for high frequency and static currents, and may therefore be lighter in weight—a distinct advantage in practice. These cords are liable to have

their conducting wires broken at sharp bends and kinks if not kept hanging in a large curve from two or more hooks when not in use. Their ends should also be examined occasionally for rust or breaks that might give slight shocks to patients, and they should be connected firmly to generator and electrode when used to avoid accidental shocks.

Electrodes for Low Volt Currents.—The galvanic and low volt wave currents always require that both electrodes connected with the binding posts of the apparatus be placed on or within the body surface, one being connected with the negative pole and the other with the positive pole. They are, therefore, always bipolar, though one is usually smaller in order to concentrate the current at or near the disease, and called the active electrode, while the other is employed to complete the circuit with as little surface effect as possible, having a wide surface, and is called the dispersing or indifferent electrode.

Active Electrodes are of shapes and sizes adapted to the particular work to be done, and will be described in connection with special application and affections.

It should be stated here, however, that the nickel-plated internal electrodes appropriate to alternating current surges and other currents without chemical action should not be used for the galvanic current except as a negative pole, as the nickel or other metal surface is eroded when it is positive and the metal ions produced are driven into the tissues, complicating the application and injuring the electrode. When it is desired that no ions are to be driven into the tissues from an internal positive electrode the electrode should be of gold, platinum or carbon. As the two former are expensive a carbon ball electrode covered with moist absorbent cotton is usually employed in vaginal positive applications, unless one decides that the mercury ion is an useful adjunct to nearly all positive applications, when a copper electrode coated, (amalgamated), with quicksilver is used. This is particularly advisable in intrauterine applications,

where carbon is at times too bulky for insertion. The mercury ion is diffused mostly from such a positive pole as it is more readily diffused than the copper ion.

Surface Electrodes, both active and dispersing, should be of a size to permit no greater concentration of current per square inch of contact than is agreeable to the patient, even when the electrode is the active one, and the dispersing electrode as large as is convenient.

Until recent years the marketable surface electrodes have left much to be desired in the perfection of skin contact and the maintenance of an even thickness of pad between plate and skin, points of extreme importance in the proper and comfortable administration of low volt currents. Electrodes with pads permanently attached to the conducting plate are undesirable. Separate pads, that may be left immersed in water in a sterilizer, when not in use and kept warm as well as moist during office hours are always more satisfactory, the connecting plate with soft rubber shield being placed over it when used. If the pad is permanently attached to the plate it becomes foul from body ions and oxidation of the plate.

The material of which the surface electrode is composed is important, the desiderata being perfect contact with the skin; sufficient thickness to absorb the chemicals formed from ions precipitated on the metal plate as nascent chemicals, and thus protect the skin; and sufficient thickness to keep the plate equidistant from the skin at all points and maintain sufficient moisture and warmth during the application. These qualities are possessed in greatest measure by asbestos with a linen cover, as kaolin and other clays that fulfill the requirements are liable to pass through the cover and soil the patient's clothing and ultimately the office itself.

The sterilizer in which these pads are boiled to eliminate accumulated chemicals and kept moist and soft should have a rustproof interior. City water or well water is used, as these contain

sufficient ions to conduct the current. It should be changed frequently, particularly if the water supply be hard.

Formerly the resistance presented by the pad itself to the passage of the current was lessened by adding sodium chloride to the water. This was only excusable (when the chlorine ion was not to be diffused) when one used weak batteries or an inadequate power supply. With modern generator supply it is no longer required, as much power as needed being turned on by the controlling device of the generator saving the patient from unnecessary suffering and the plates from rusting from the chlorine developed at the negative plate. Poorly designed or rusty surface electrodes are sure to discourage a beginner in low voltage therapy, and render the finest generator useless.

Sand Bags and Shot Bags.—Bags of clean seashore sand about half the size of the large surface electrodes are very useful to hold electrodes in place as well as smaller bags partly filled with bird shot. These may be kept clean by enclosure in slip covers.

CHAPTER III

RESISTANCE

The Body as a Conductor of Galvanic and other Low Voltage Currents—the Body an Electrolytic Conductor—Diffusion and Concentration of Low Voltage Current within the Body—Distribution of Resistance in Body Circuit—Area of Electrode Contacts.

The Body an Electrolytic Conductor.—Regarded as a conductor of electricity of moderate pressure the human body is a broad conductor composed of varying concentrations of electrolytes in solution enclosed within a partially conducting envelope, the more horny layers of the skin. For the current to reach the better conducting interior it must pierce the poorly conducting sheath, the skin, which nature has apparently designed as a protecting covering. The total resistance through two layers of the skin, as between metal discs on the dry skin of the palm and the dry skin of the sole of the foot, may be as great as 4000 ohms when the contact plates are small. Changing to broader plates with moist pads blotting out the small layer of air between the metals and skin, and using a skin area that has more ions in it, as sweat gland openings, the resistance may be lowered to one or two hundred ohms. If the skin be eliminated entirely by broad contact needles thrust into a malignant growth the resistance will be lowered still further to fifty or even forty ohms. Surface electrodes are therefore important portals for current to the inner part of the body through a difficult territory, and too much attention cannot be paid to their appropriate area and technical qualities.

Diffusion and Concentration of Low Voltage Current Within the Body.—A low voltage current tends to spread out and fill a broad conductor, at its point of entrance, reconcentrating its *lines of flow* at the point of exit. This occurs in

the human tissues after the penetration of the skin or mucous membrane. Since the energy effects on tissues depend on the concentration of these lines of flow, our ability to carry effective concentrations to deeper parts is decreased by this spread, and must be compensated by increased milliamperage.

Distribution of Resistance in Body Circuits.—The ideal concentrations and diffusions of the lines of flow shown, are actually altered by the differing resistances of the various tissues traversed as well as by the skin.

Since the work is done by a current in any given organ in its path, its expenditure of energy is proportional to the resistance encountered, as well as to the number of lines of flow through the organ. There will be an unequal distribution of action in deeper parts that is not entirely explained by their density.

Area of Electrode Contacts.—Since all the lines of flow entering and leaving the body must pass through the portals of electrode contacts, and their local effect on skin or mucous membrane is proportional to their density at these points, the importance of electrode contact surfaces in relation to dosage is evident. This is particularly true at the active pole, where concentration is needed for local action or to reach deeper parts with effective dosage. A ten milliampere current, for instance, is twice as concentrated and twice as locally active on an actual contact of one square inch as on a contact of two square inches.

Conversely, when we select a dispersing pad to merely complete the circuit with as little local action as possible, we should select one as large as practicable.

CHAPTER IV

CHEMICAL EFFECTS OF THE GALVANIC CURRENT

Electrolysis—Electrolysis of Living Tissues—Polar Regions—Deposit of Foreign Ions Within Polar Regions—The Interpolar Region.

In considering how we are to influence living processes within the body by passing a galvanic current through it, we should recall that this composite electrolyte is throughout life the seat of innumerable dissociations and reassociations of the molecules of which it is made up and which are fed into and drained from it: that these changes are a part of life itself, and their proper action essential to health. Each such dissociation and reassociation is accompanied by electric phenomena.

The several organs, moreover, release currents of small voltage and small amperage by this action that flow in definite circuits, the wattage varying with the functional activity of the organs—all of which is taught in the physiologic laboratories of the medical colleges. We also have those variations in the prevailing acid and alkaline conditions of the body as a whole that have frequently been studied by physiologic chemists.

To introduce into this microcosm of molecular changes, in which gentle currents of electricity are being wafted in definite circuits a much greater current from without—a current of the same nature, yet differing as a hurricane differs from the gentle breezes of the countryside, must have alterative effects of a definite local character that are capable of remedial use. Such effects are found only with the galvanic current.

These effects of the galvanic current differ in *nature* at the polar portals of entrance and departure, and also in *concentration* at the poles and in the interpolar region. The effect of concentration and diffusion have been described in the previous paragraphs.

The action of the poles will be best understood after a statement of the phenomena of electrolysis.

Electrolysis.—The direct or galvanic current differs from other medical and surgical currents in producing a definite chemical change in the body during the whole time of its passage, due to the persistence of the molecular changes by which it is conducted through the body electrolyte; the other currents, while producing chemical changes in proportion to their wattage, have either *so slight a change*,(static), or the change, while great, is *so quickly reversed back and forth*, (alternating currents, high frequency current), as to be unable to indicate its presence biologically or chemically.

The chemical change produced by a static current, (which is a true direct current, though differing so greatly from the galvanic in voltage, milliamperage and continuousness), can be easily detected by the wet litmus paper test described on page 24 when the generator is producing a full charge.

Apply this test, or the potassium iodide test, on the other hand, with an alternating or high frequency current: No gas evolution will occur at either pole and no color will appear at the positive. Both these currents are also carried through the body by ionic changes in molecules, but the changes are too brief to produce chemical reactions that will register on our senses.

Electrolysis of Living Tissues.—The term electrolysis in its medical applications should be restricted to the surgical minor operation in which the dissociation of tissue accomplished physical destruction of it at one or the other pole by sufficient concentration of the lines of flow at a small electrode contact, whether it be the great concentration of a small current at the tip of a fine needle, as in the epilation of a hair or the destruction of a mole by the negative needle, or the concentration of massive currents to comparatively small electrodes to coagulate tumors by the direct current. In either case we have a true electrolysis or electric dissolution of tissue.

When we apply the galvanic current medically, on the other hand, by dispersion of the lines of flow by broad electrodes at the surface contacts and the arrest of the nascent chemicals appearing at the metal plates by thick pads, we achieve an equal dissociation and reassociation within the body electrolyte, but *without destructive polar effects*. Medical applications of this current should therefore be regarded, not as electrolysis, but as possessing chemical effects not necessarily destructive.

Polar Regions.—For some distance beneath each pole the galvanic current presents different chemical concentrations due to electrolytic conduction, the depth to which they extend being determined by the wattage and duration of the current. Alkaline ions accumulate in the region beneath the negative pole and acid ions in that beneath the positive pole, *both giving up their electric charges on reaching the metal plate of the electrode and becoming nascent atoms*. This is evident to the eye when pointed metal electrodes are inserted into a malignant growth in a major operation of direct current coagulation, and may be described as follows:

At the negative pole, with a current of 250 to 1000 milliamperes, the effect shows in a few moments as a semi-translucent infiltration of alkaline bases and hydrogen gas in immediate contact with the metal, accompanied in a few minutes by the issuance of a highly alkaline froth, which soon becomes greenish in color from the bases of hemoglobin etc. and so abundant that it has to be wiped away to keep the field of operation in sight. This froth is composed of the watery components of the tissues and vessels of the growth and hydrogen gas, water being abstracted from the tissues at the negative pole, the tissue bases giving it a soapy character. If the current be increased above 1000 milliamperes the tissues will shortly become dissolved about this electrode and it may fall out, or pull out if a hook.

At the positive electrode, *if the electrode be an unattachable metal*, a retracted, dry, horny area will show itself less quickly around the electrode in such an operation. If the area of con-

tact of the electrode is small the tissue immediately about it will become drier by its watery contents being driven in, and as this increases the resistance the current will fall at the meter and more voltage will have to be turned on at the controller. If moisture is found next the instrument its reaction will be acid. *If the positive electrode be composed of zinc*, as in these operations, the retracted tissues around the electrode will soon show a dense white coloration that extends towards the negative pole and ultimately meets the negative region, leaving the intervening tissue completely devitalized. This white area is composed of zinc eroded from the electrode by the attacking oxygen and chlorine of the dissociated tissue and fluids, the zinc ions when eroded from the zinc electrode being driven from the latter into molecular union with an ever spreading zone of acid tissue ions along the lines of flow to the opposite pole.

Considering for the moment only the polar effects occuring when both electrodes are of unattachable metal, as described in the first part of the preceding paragraph, it is evident that the alkaline reaction at the negative pole and the acid reaction at the positive are due to the ions of body molecules driven to the poles by the current.

A similar alkaline concentration is found in the negative polar region beneath a negative electrode in a medical galvanic application, and an acid concentration beneath the positive electrode, both concentrations being of body ions.

The *depth* of these concentrations depends on the voltage and duration of the current and its *density* on the milliamperage.

Deposit of Foreign Ions within Polar Regions.—In an ordinary galvanic application the current is conducted through the moisture of its electrode pads by the earthy and other salts in ordinary water, there being therefore a diffusion into the body of ions from the electrode pads in these applications.

If the electrode pad is freed from impurities and impregnated with a drug composed of a binary molecule dissolved in distilled

water, the action ion of the molecule is driven into the polar region beneath the proper electrode and the inactive ion backwards against the plate of the electrode. This constitutes medicinal ionization.

Surgical ionization occurs when the ion of a caustic molecule, as zinc, copper, silver, etc., is driven in, as illustrated in the operation described above. Such a molecule may be eroded from the metal or dissociated from a solution of a salt of the metal in contact with it.

The Interpolar Region.—It is evident from the preceding statements that a flow of ions takes place throughout the circuit of equal speed and amount, but that the concentration of these changes must be slight in the broad, divergent paths deep within the body unless powerful amperage is used. Moreover, these changes are ionic—not atomic, with consequent absence of the possibility of direct medication within deep tissues. Forced ionic changes within and between organs may, nevertheless, have remedial action.

The question of the action deep within the interpolar region of an abrupt wave of galvanic or other current is different. If we can carry an abrupt wave of even a half a milliampere concentrated in a half inch cross section of an intestinal muscle or abdominal gland, as can probably be done when 100 or 200 milliamperes are driven through the skin, there is no possible doubt of deep muscle or neuron response.

CHAPTER V.

THERAPEUTIC ACTION OF GALVANIC POLES

Identification of Polarity—Importance of Selection of Pole—Differential effects of poles—Action on Special Senses—Reflex Stimulation of Neurons by Galvanic Waves.

Identification of Polarity—Connect a conducting cord or piece of wire of convenient length to each binding post of the generator and, carefully keeping the other bare ends of the wire from touching each other and thus short-circuiting the apparatus, dip them in a glass of water in which a teaspoonful of table salt has been dissolved, holding the ends about two inches apart in the water. Upon turning the current on the saline solution will be freely electrolysed and an abundance of gas will form at the negative pole, (hydrogen), while less will appear, (oxygen), at the positive pole. The difference in amounts of gas will readily identify the polarity.

Or, if doubtful, drop a little potassium iodide into the solution: a brown coloration of free iodine will appear at the positive pole.

Or, pass the current through the length of a wet strip of litmus paper lying on glass or other non-conducting surface: a blue color will appear at the positive pole.

Vital Importance of Selection of Pole in Galvanic Applications.—The practical importance of selecting the proper galvanic pole for the active electrode is even greater than would seem evident from the facts stated in the previous chapter, for a wrong selection may not only defeat the object of treatment but aggravate the condition to be relieved. Probably the strongest illustration of this is a mistaken or accidental use of the negative pole within the uterine cavity to control hemorrhage. While any non-menstrual bleeding may be checked at once by the appropriate use of the positive pole and its recurrence prevented

by repetitions of the application, the use of the negative pole would increase the flow instantly, and if no other harm was done, might lead to loss of the patients' confidence and thus failure of a relief that could be absolutely predicated on the proper application. In the field of purely medical effects, lack of accuracy of selection would produce an acid concentration when an alkaline concentration might be more effective, and vice versa.

The medical differences in the relief of pain are very great. *The positive pole tends to relieve pain* if the painful spot can be brought within this polar region, possibly by a drying effect, or possibly by its chemical action. *The negative pole is likely to aggravate pain* if the seat of pain can be brought within its polar concentration.

The surgical relations of the two poles to pain correspond to their medical effects. In other words, a current of a half a milliampere or more, concentrated on the point of a needle in the skin or mucous membrane, is always more painful when negative than when positive. When polarity is not important in minor galvano-surgery, (though it usually is very important), one may apply a minute surgical concentration of the positive pole with far less pain than with the negative.

Direct Polar Effects of Galvanic Currents.—Stated succinctly, therefore, the positive pole arrests hemorrhage by producing an acid coagulation and a drying effect; produces vasoconstriction: is sedative to sensory nerve endings and thus relieves pain; and when concentrated surgically produces an acid eschar.

The negative pole produces hyperemia and stimulation of tissue by attracting water from the tissues; causes vasodilation; aggravates pain and is irritating; and when concentrated surgically produces an alkaline softening and dissolution of tissue rather than an eschar.

An important polar action of the galvanic current is its wave action, which will be discussed more fully in Chapter VII.

When thrown into waves this current surpasses all others in forceful stimulation of motor neurons and muscles, the stimulation differing at each pole, alternating waves being nevertheless often preferable because less painful and without the chemical effects of the galvanic. In some instances, as in Wallerian degeneration of muscle, this added and differing wave effect is useful in causing contractions of muscles when waves of less duration and bulk are ineffective.

A most interesting and too often neglected action of these polar concentrations, particularly in waves, is that on the terminal organs of special sense. Alone among electric currents, the galvanic, either waveless or in waves, will cause responses in these nerves, producing the electric flash in the retina, electric sounds in the auditory mechanism, electric odors in the olfactory nerve and electric taste in the gustatory nerve—all with an exceedingly small milliamperage traversing the nerves, and each response differing with the polarity.

A fact of equally great, if not greater importance than the direct stimulation of the nerve terminals of special sense by this current is the reflex stimulation of these organs that is possible with this current and with heavy amperage alternating waves. The application of a weak galvanic wave to any part supplied by the fifth nerve will cause the electric flash, and a heavier current will produce the flash when applied as far away as the neck or even the shoulder. That this response is reflex and not due to a direct transmission through the retina or optic nerve has been determined by us. We failed to obtain the flash in a patient with anesthesia of the skin of the forehead when both poles were confined to the anesthetized area. Moving either electrode beyond the area brought instant flashes.

The therapeutic possibilities of this reflex stimulation with slow and bulky waves indicates their use in stimulating the neurons of abdominal glands that are too deeply situated to be readily brought under polar influences.

CHAPTER VI

THERAPEUTIC USES OF THE CONSTANT OR WAVELESS GALVANIC CURRENT

Two Remedies in Galvanism—Waveless Galvanic Currents—Choice between Galvanism and Diathermy—Medical Galvanic Applications without Medicinal Ions.

In the galvanic current the physician has two widely differing remedies, even from the purely medical point of view: the waveless current and the wave current. Conditions in a given case, such as an atrophied muscle after Wallerian degeneration, may indicate the value of both—that a galvanic wave as well as the negative polar action is indicated. But when greatest galvanic action uninfluenced by waves is needed, as in deep polar acid or alkaline concentrations within tissues or deep polar diffusion of drugs, it is extremely undesirable to have any waves or other sudden variations of the current, *because the added pain will limit the amount of the dose or its duration.*

Waveless Galvanic Applications.—In all waveless galvanic applications, therefore, the generator should produce a smooth current; the conducting cords should be tightly attached at both ends and not subjected to movements that might break their connections; the electrodes should be in place before the current is turned on, this being rendered certain by a glance at the controlling device before placing them to see that no current is turned on; and with everything in place, the current is turned on very slowly until only a part of the dose is indicated at the meter, taking often three to five minutes to reach the maximum. On the completion of the application, the current is turned off fully as slowly as it was turned on, any change giving rise to some discomfort.

Choice Between Galvanism and Diathermy.—This current, as pointed out, differs greatly from other methods and its

indications are usually definite. Yet there will be at times a difficulty in choosing between it, when waveless, and diathermy, in conditions indicating the value of hyperemia; for, though heat production is neglible with the galvanic currents used in medicine, (direct current surgery using far more power and concentration), the chemicals and water accumulating in the negative polar region cause pronounced hyperemia. But this negative pole galvanic hyperemia is superficial compared with the deep heating action of diathermy. The choice should be largely governed by this fact, together with the possibility of a remedial effect within this deep region from the ionic changes in the interpolar region.

This choice between diathermy and galvanism is sometimes best decided by using both, the galvanic effects being helped by a previous diathermy application.

Medical Galvanic Applications Without Medicinal Ions. Straight Galvanism.—The medical conditions in which the modern physician turns to diathermy have in great part been treated by the older physiotherapists for years by waveless galvanism, often with pronounced success in spite of handicaps of armamentarium, now happily past. These were conditions in which an increased local metabolism seemed to be indicated, such as post-traumatisms, chronic neuritis, the arthroses, etc. In such applications at present one is tempted to add a suitable drug to the appropriate electrode, in spite of the opinion of an eminent English authority, Major Turrell, that it is the galvanic effect that yields results rather than the drug when the latter is used.

A mode of action that may also influence therapeutic results is that of counter-irritation at the surface and beneath either electrode, particularly the negative. This effect is limited to this current among electric methods.

The use of the waveless galvanic current without drugs in the conditions mentioned will commend itself to the office

practitioner for several reasons: the commercial surface electrodes may be used with the plain galvanic current but are not well adapted to drug diffusion; a treatment that is time-consuming, capable of explicit prescription and demands many repetitions may be turned over to the trained assistant when these electrodes are used; and the presence of simple ions rather than drug ions in the pads is less likely to cause skin irritation.

Though the commercial electrode, with pliant waterproof cover is particularly convenient in these applications, there is no less need than in drug diffusion for a sufficient thickness of pad to retain moisture and protect the skin from the chemicals that are precipitated on the metal backing, the thickness also serving to keep the plate equidistant from the skin. The local polar bath is particularly well adapted to galvanism when it can be used, as with the elbow or an extremity, and the conducting plates in the bath kept equidistant from the skin.

A variable problem is that of maintaining a good contact of the pads to contours, and to surfaces where gravity will not keep them in contact. They may be held in position by a cotton elastic bandage, though this will become wet and conduct the current itself.

Since all prolonged applications should be made with the patient recumbent on a couch or otherwise placed for comfort and to relieve muscle strain, one may often adopt the following procedure: Place a soft sand bag beneath the part, if a limb or shoulder joint, with the larger surface electrode on it, permitting better adaptation to curves, then apply the active surface pad on the upper side of the part with a shot bag over it.

Though commercial surface electrodes when properly made and kept sterile in a rustless container are the most convenient for this work, one should not make the mistake of using too small an electrode. The active electrode, if one is to be active should have a superficial area somewhat greater than the part to be brought under its polar influence, while the indifferent

electrode should be large enough, compared with the active, for the patient to detect little or no sensation from it.

Whether one should place the dispersing or indifferent pad on the opposite side of a part or on a distant skin surface depends on circumstances. In a joint the deepest and most direct passage of the lines of flow, occurs with the electrodes on opposite sides. Where a polarity effect is desired the other polarity should be removed to a distant and preferably opposite skin surface.

A review of the immense literature relating to the value of straight galvanism in particular diseases is confusing for two reasons: First, the development of greatly improved diagnoses of diseases and more accurate knowledge of their pathology and etiology during recent years has explained many weary hours in electrotherapeutic clinics devoted to nervous diseases in particular—weary because of deferred hopes in spite of occasional successes.

Secondly, it is now evident that most of the technic of the past, with its small surface electrodes of imperfect materials and construction, was nearly if not quite as defective as the uncertain batteries, meterless current, and the absence of electric units then unavoidable.

These inherent faults were rather added to in the older literature by attempts to specify the exact technic in each particular disease. A simpler and more instructive plan, and one followed in the present work, is to consider a method as one would consider a drug—its proper actions and their indications, and the best forms of administration, in order that the intelligent physician may use it to meet his problems.

The consideration of a method in the same manner as a drug, as, for instance, arsenic in syphilis or digitalis in myocardial weakness, indicates that *dosage* is essential to effective action. Dosage in galvanic currents includes proper surface electrodes,

sufficient milliamperage and sufficient duration and frequency of repetition of applications; and the subject can be lifted from empiricism only by this full attention to adequate power for the work to be done. It took many years to learn how to run a street car with electricity, adequate power being the most important factor.

We are convinced that adherence to proper technic will open new and greater possibilities to these chemical currents.

The technic of percutaneous applications of the galvanic current applies largely to low volt wave currents, and the tendency among physicians to apply more than one method during a treatment is readily followed by leaving surface electrodes in place after a galvanic treatment and turning an alternating wave current on, the proper surface electrodes being the same; or, after one form of treatment with both electrodes on the surface, an appropriate vaginal or rectal electrode is submitted for one and a vagino-abdominal or recto-abdominal application made. Wave currents after galvanic applications are, of course only indicated when contractile tissues are under treatment.

The technic of special applications to various internal parts of the body is given in Chapters XIII and XVI.

CHAPTER VII

DIFFUSION OF DRUGS WITHIN POLAR REGIONS

Uses of Ionization—Molecules and Ions—Strength of Solutions of Drugs for Diffusion—Purity of Solution Essential—Technic of Ionization—Selection of Pole—Reported Therapeutic Value of Iodine Ion—Mercury Ion—Chlorine Ion—Cocaine Ion—Salicylic Ion—Quinine Ion.

An important use of the galvanic current, and one confined to it alone among physiotherapeutic methods, (for the only other unidirectional current, the static, has insufficient volume), is the local administration of a drug by it, with a threefold purpose: 1, to merely add to the possible effectiveness of the straight current, as in driving chlorine into the negative polar region in promoting absorption of scar tissue; 2, to flood a polar region with a drug in its ionic state with the hope that a concentration of its molecules may be secured in that region that would require huge quantities to equal if administered by mouth; and, 3, to produce a more profound action of a drug on a part within a polar region by reason of the fact that it forces a drug into immediate union with the protoplasm of the cells, instead of the slower osmotic penetration from the bloodvessels and lymphatic spaces. A demonstrated result of this more intimate union of drug and protoplasm in the case of cocaine, according to Leduc, is a more prolonged anesthesia, as absorption into the general circulation is delayed longer than after hypodermic injection.

An immense stimulus was given to this method of local administration of drugs recently by Prof. Stephane Leduc, of the School of Medicine at Nantes, France, whose accurate chemical and biophysical deductions and laboratory and clinical experiments are most illuminating and valuable. His work has been fully corroborated by others, particularly the late Sir Lewis Jones, though qualified by certain drawbacks and disadvantages mentioned on following page.

Amount of Drug Diffused.—The amount of the drug diffused is exactly proportional to its atomic weight and the millicoulombs, (milliamperes multiplied by the seconds of flow) of the current. The stronger the current, therefore, and the longer its duration the more of the drug and the deeper it is diffused. With a drug whose active ion is irritating to integument our ability to diffuse it to any depth beneath the integument is governed by our ability to protect the skin or mucous membrane from undue irritation by careful technic and by removing excess solution from the skin by an oil or cold cream after treatment, some of the latter being left on the part in anticipation of the next application.

Another fact that lessens the depth and concentration to which we may flood a region with a drug is the activity of the circulation in the part treated, as pointed out by Turrell, the peripheries of the polar region and the polar region itself being continuously robbed of the drug during and after the application.

In spite of these drawbacks, the diffusion of certain medicinal drugs directly into a polar region beneath or beyond the electrode appropriate to it has some exceedingly valuable uses in medicine, and will doubtless be extended intelligently beyond its present vogue when its advantages and limitations are more generally understood.

An even more important use of the method is the employment of the caustic and sterilizing metal ions in minor surgical procedures. These are of very great value in such conditions as surgical tuberculosis, we believing it to be almost a specific in stubborn sinuses and ulcers.

Molecules and Ions.—The physician unfamiliar with the latest views of electrochemistry should not turn from the subject of ions as too recondite for a busy man. It is a part of every dose of medicine he orders, no matter how taken, for if his medicament is a binary compound, (and nearly all are), it is dissociated in part by the very water in which it is dissolved, or by the watery fluids of the body if administered in pill or powder

and dissolved in the stomach, and the action of the medicine is governed by the number of atoms in its active ion. Bromides, for instance, owe their activity to the bromine ion, which separates from the potassium ion with which it is usually united when it is dissociated by water or the current and unites with nerve protoplasm within the body. The reason why some other salts of bromine are slightly more active than the potassium bromide is that they hold more bromine atoms to the ion.

Binary drugs doubtless circulate through the body as ions however administered, protected by their traveling charge of electricity from displaying their nascent characters until they meet the opposite ion affinity, union with which gives their special medical response.

One of the simplest illustrations of the interesting fact that an ion may travel through a solution of molecules with which it readily unites without showing the usual chemical sign of nascent union with them *while possessed of an electric charge* is shown in the following experiment with iodine and a solution of hydrated starch:

Place some recently cooked, thin flour paste in such a non-conducting utensil as an enameled ware pus basin, to the depth of nearly an inch and dip into each end of the paste a metal plate connected with opposite poles of a galvanic generator, seeing that each plate makes good contact with the paste and that they are about four inches apart.

Drop two or three drops of tincture of iodine in the paste immediately at the negative pole. The iodine will make a pool of a densely blue color by union with the starch. Now turn on a current of fifteen or twenty milliamperes.

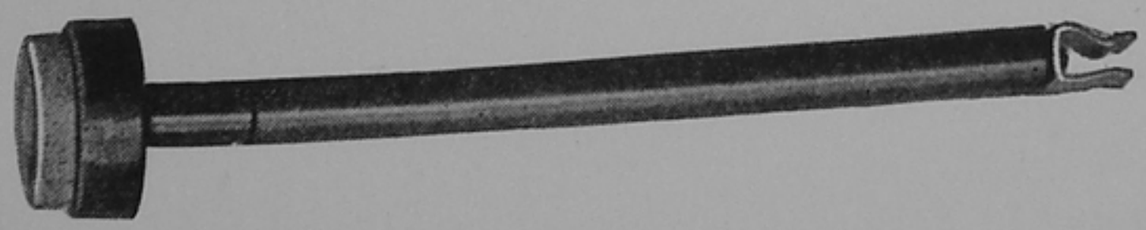
In three minutes after the current is turned on a blue spot will appear on the point of the positive plate nearest the opposite plate, *without any appearance of color in the four inches of starch solution between the plates.* In five minutes the spot will increase to the size of a pea with this amount of current, and in twenty

minutes the whole edge of the positive plate will show blue spots without the intervening interpolar region showing color. Since the current itself is carried by the various ions in the paste, the new ions in it will gradually reduce its resistance and the milliamperage will gradually increase during the experiment without change in the controller.

As has been described, where the positive pole for the purpose of difusing drug solutions is indicated. Carbon, Gold, or Platinum must be used to prevent local oxidation and thus inhibit the action. Fig. 1 is an electrode for the purpose, having carbon within its circular treatment surface, surrounded by a ring of soft rubber; absorbent cotton is generally used saturated with drug to be applied.

It may also be adapted for a Cataphoric application with the negative pole if the surface of the electrode is sufficiently large for the case at hand.

Fig. 1



Cataphoric Electrode

We do not ionize a drug by the current. Dissociation of its molecules into ions is done in part and made easy in the remainder by *mere solution in water*, as previously remarked. What the galvanic current does is to drive the free ions forward or backward in its path and force the freeing of others and their similar passage forward or backward, according to their charges, which are always of opposite sign to the pole that they are driven towards.

Ions are *simple* and *complex*, a simple ion being one made up of a single element, as iodine in iodide of potassium. A complex ion is composed of a number of elements in chemical union, as the cocaine ion in hydrochlorate of cocaine and the quinine ion in sulphate of quinine. The latter retain their special composition in ionization diffusion and are not decomposed by the current into their ultimate elements.

Strengths of Drug Solutions for Ionization.—The amount of a drug that we can drive into its appropriate polar region will not be increased by using a strong solution but rather the contrary, beyond 1 or 2 percent. The number of ions driven in is determined by the milliamperage and its duration, and their depth by the voltage speed of the particular ion and the current duration. The amount of dilution of a drug rather facilitates its diffusion, as the drug molecules are more thoroughly surrounded by the solvent. Percentage accuracy of solutions is therefore unnecessary within reasonable limits. Approximate solutions of 1 per cent. or about 5 grains to the ounce, will serve for all medicinal diffusions.

Purity of Solution Essential.—The drug should be dissolved in distilled water, now readily obtainable since widely sold for dilution of the solution in automobile batteries, water from water pipes containing enough ions to materially reduce the number of medicinal ions diffused by replacing them.

Technic of Ionization.—The technical details are practically the same for all drug diffusions, save for selection of the proper pole for the drug and fitting the active pad to curved and internal surfaces.

If the local electrode bath is practicable, the solution may be used many times, or until considerable debris of ions extracted from the body collects at the bottom, when it should be renewed. When the active electrode is positive, plates dipping into the solution should be of carbon, though aluminum may be used as it is but slightly attacked at this pole, (being more attackable by alkalies), and the ions from it are harmless.

As remarked in a previous paragraph, commercial asbestos pads may be used for drug diffusion, but they should be separable from their plates, boiled fairly free from other ions, and dedicated for use in the special case until re-boiled for other use. For complete impregnation with the drug solution it should be dried out after boiling.

Occasionally a more perfect contact with the skin may be secured when the latter is sensitive by a thin muslin pad made to the shape of the surface and filled with kaolin or asbestos. Such a pad should be kept moist and soft in a non-corrodible receptacle between applications, and warmed and supplied with additional solution when next used, complete saturation being maintained during treatment by additional solution from a dropper.

Finally, a thick absorbent cotton pad may be used, this requiring more weight to maintain in position, or a bandage, and as more solution drips from it than from the pads described above, the dropper should be used more frequently.

The *conducting plate* laid over either kind of pad should be of tin or tin-covered lead, and it will adhere to the two first pads described. A light-weight fine wire conductor may be attached to it by threading the wire through pin holes in the corner of the plate and turning the latter over the wire several times, making a shockless joint. Lack of weight in the conductor lessens the chance of accidental displacement of the plate and consequent shocks. The conducting plate should always be smaller than the pad to prevent a concentration of the current around the edges of the pad.

The current is turned on slowly, taking five or even ten minutes to reach the maximum dose to be applied, the latter being dictated usually by the patient's comfort. At the completion of the diffusion the current is turned off even more slowly than it was turned on, especially when the positive pole is on or near the head or neck, as vertigo is easily produced by variation of positive polarity near the ear.

The duration of a drug diffusion should not be less than thirty minutes, as time must be allowed for sufficient extension of the diffusion in a polar zone to reach the tissues with which the ions are to unite. Increasing the milliamperage will increase the number of ions diffused but will not materially hasten their penetration, time being essential, each particular ion having its own speed within an electrolyte, hydrogen being the most rapid.

Selection of Pole from which to Diffuse a Given Drug.—A consideration of the chemical relations of the medicinally active ion will determine the pole under which it should be diffused. Basal ions of a molecule, such as metals and alkaline bases, and alkaloids, as cocaine and quinine in their salts, are diffused from the positive pole. Acid and halogen ions are diffused from the negative pole, as the salicylic ion from salicylate of sodium; the chlorine ion from chloride of sodium and the iodine ion from iodide of potassium or from mere solution in water.

REPORTED THERAPEUTIC VALUE OF A FEW MEDICINAL IONS.

Iodine Ion, (diffused from the negative pole).—The ready penetration of the skin or mucous membrane by an alcoholic solution of iodine merely painted on the skin or membrane, without an electric current of any kind, is a familiar fact to clinicians. A drawback is the irritation caused by a concentrated solution, preventing repetition of the application. When

the object is the treatment of a condition a short distance beneath the electrode, such as an adolescent goiter, an equal or greater penetration may be secured from a 1 per cent. solution of a salt of the metal under the negative pole, with somewhat less irritation, permitting repetition as often as every other day.

Chlorine Ion, (diffused from the negative pole.)—Whenever the negative pole of the galvanic current is used with a pad moistened with ordinary water some chlorine ions are surely diffused into the body from the chlorides held in solution. The value of the negative pole in promoting absorption of sclerosed tissue has long been known, and is apparently increased when a little table salt is added to the water of the electrode, yielding a full supply of the ion. Leduc, in the work cited, gave such striking proof the *sclerolytic effect* of the chlorine ion that it was largely employed in the physiotherapy departments of the hospitals during and after the late World War. The sharp burning sensation in the skin under the negative pole is largely due to the chlorine ion.

Cocaine Ion, (diffused from the positive pole).—Anesthesia can be produced in the skin in five minutes by the cocaine ion from a weak solution and in less time in the mucous membrane, and is said to last longer than when administered in any other way. Too long an application is said to produce a brown discoloration of the skin. The chief experience of the authors with this ion is in lessening the pain of zinc-mercury ionizations of sinuses, when the burning sensation of the zinc ion at the skin opening of the sinus can be practically banished by sprinkling a small amount of cocaine flakes on it before inserting the electrode.

The Salicylic Ion, (diffused from the negative pole.)—The salicylic ion is reported to have given good results in skin affections, dry pleurisy and chronic rheumatic conditions, the latter limited of course by the moderate extension of the polar region with currents of ordinary strength and duration. It has but

slight irritating qualities and may therefore be frequently repeated, making it possible to relieve the stomach from some of the discomfort of this drug.

The Quinine Ion, (diffused from the positive pole.)—This drug, when diffused locally as an ion, has recently received prominent mention as a remedy for persistent neuralgia of the referred type, particularly trigeminal neuralgia; and has even been of service in that most painful and usually incurable local form of the latter, *tic douloreux*, after operation had failed to permanently relieve the pain.

While trigeminal neuralgia has been relieved by several electric methods, true tic douloreux seems to be made worse by any treatment that produces heat or hyperemia, usually bringing on an attack. Prof. Bergonie, of Bordeaux, France, recently a victim of his early work with the X-ray, and some other French and Viennese physicians announced some thirty years ago the relief of this condition with the plain galvanic positive pole, giving as much as 60 to 80 milliamperes for half an hour. It is impossible that such a strong and long application might actually carry the polar region to the reputed site of the disease in the Gasserian ganglion, but we should remind ourselves here that clinical evidence is safer than speculation, and that we do not really know the pathology of this disease.

For application to the face the patient should lie on a couch or reclining chair with head rest, with a large dispersing pad beneath the back. A soft pad of asbestos or kaolin in thin muslin is made to fit the affected side of the face, if all branches of the nerve are affected the pad being in the shape of the letter E, with openings for the eye and mouth, over which is laid a smaller plate of thin tin or aluminum of the same shape with light-weight conducting wire attached. Gravity and adhesion should keep this electrode in place, but it may be held by a bandage. The pad is fully saturated with a 1 per cent. solution of bisulphate of quinine in distilled water, and it is kept saturated during the treatment by adding the solution with a dropper.

When the application is made to the affected mucous membrane within the mouth, as is wise at times, the patient may sit in a comfortable chair with a loop of gold or aluminum wire heavily covered with absorbent cotton saturated with the solution as active electrode, the part of the wire passing through the lips being covered by fused sealing wax or thin rubber tubing. The lips may be oiled to prevent undue action on them.

The absolutely waveless current is turned on slowly, on account of the hyperesthesia usually present and because of the proximity of the ear, and as slowly turned off at the end of the application. Effective current strengths seem to vary from 5 to 15 milliamperes for not less than thirty minutes.

The Lithium Ion, (diffused from the positive pole).—Thomas A. Edison directed some experiments on the diffusion of lithium in *gout*, under medical supervision, some years ago, the gouty member being placed in a bath of a lithium salt that was connected with the positive pole with the other member in a salt water negative bath. A prolonged course of the treatments ameliorated the condition.

Several European physicians have used the method, with a current as great as 200 milliamperes. One of these, Bordier, analyzed the sediment remaining in the active bath after it had been used a number of times, finding uric acid.

The Magnesium Ion, (diffused from the positive pole)—This ion is driven in from solutions of magnesium sulphate. So far as the authors are aware it has been used only for the *multiple warts on the skin* of the hand common in children, but judging from the recent practice of employing solutions of Epsom salts externally for the relief of pain, there may be a wider field for its ionic use.

In the treatment of the variety of warts alluded to a single application may be effective, the usual tenderness being allayed and the warts being left to disappear by attrition and exfoliation

when the hands are washed, no trace being found after several weeks. The palmar surface of the hand is laid on a negative pad and pad of absorbent cotton containing the solution over the warts, including them all under its surface if possible.

The Mercury Ion, (diffused from the positive pole.)—The authors are not aware of any experiments with the mercury ion in the treatment of *syphilis*, but the advantage of driving in this drug from one of its salts by some arrangement of bath electrodes is evident, when compared with attempts to cause its absorption by the skin while associated with an oil.

To add a sterilizing effect, as well as lubrication after the application, of a positive electrode to an infected endometrium and for the destruction of infection in sluggish wounds; daily applications may be necessary until the cavity heals. To destroy tuberculous foci by direct diffusion into the focus of the drug in its nascent state, this and the previous object are obtained by using copper or zinc probes coated with quick silver as the positive pole within the cavities.

The mercury ion is usually associated with copper or zinc ions in the office applications mentioned above by being diffused from copper or zinc electrodes coated with the mercury, more mercury ions being diffused by the current than the other ions, particularly copper, as the mercury is more attackable. Pure mercury, diffused from a gold electrode, as ascertained in a long series of applications by us, is not especially cauterant and only slightly destructive of tissue, and has a value as predominantly sterilizing rather than destructive in such applications as in the local treatment of *trachoma* with an amalgamated gold needle. When diffused from an 18 karat gold electrode the mercury alone is diffused, after the alloys on the surface of the gold have been diffused with the mercury. All the mercury on a gold electrode may be driven in if a heavy current is used for a moderately long time, leaving a pure, yellow gold surface that is somewhat roughened.

A copper positive electrode with active surface about the size of the inch-and-a-half end of a Simpson uterine sound, freshly amalgamated before treatment, will lose much of the mercury after 40 milliamperes have passed through it for five or ten minutes, showing a greenish lead-colored surface.

A zinc positive electrode of the same size retains a bright quicksilver surface after a number of such applications, but the zinc will be distinctly eroded, zinc being nearly as attackable as mercury.

Copper and zinc ions have long been diffused from solutions injected into a cavity or held in a covering of cotton on the electrode, and their diffusion in this manner is often valuable when all parts of an abnormal cavity is to be reached, but injection into the uterus is unsafe, and a covered electrode too large. The quick silver coated instrument is generally best in natural cavities, the mercury preventing the sticking of the electrode after treatment as well as adding to the sterilizing action.

Amalgamation, or coating these metal electrodes with liquid mercury is accomplished with ease when the electrode is gold, merely dipping the bright gold surface causing ready covering. In fact, the instrument will probably be dissolved entirely if left in the mercury. A copper surface, if bright, will also take the metal easily, though an invisible film of oxidation may have to be removed with emery cloth at times. When tarnished it should be rubbed with emery cloth and then dipped in 10 per cent., or 25 per cent sulphuric acid and water, then into the mercury, and rubbed with a wet cloth; repeating until a bright coating is attained, when the acid is washed off.

A zinc electrode is amalgamated by the same procedure, but with much greater ease if bright. As the mercury sinks deeply into zinc and gold especially, making them extremely brittle, great care is to be used in the employment of zinc and gold coated instruments within cavities for fear of breakage.

CHAPTER VIII

CAUSTIC ION OF USE IN SURGERY

Surgical Ionization—Zinc Ion—Copper Ion—Silver Ion—Ferric Ion.

When one of the heavy metals, such as iron, silver, copper or zinc, is used as the positive pole of the galvanic current, or a salt of the metal, the metal is eroded by the tissue anions, oxygen, chlorine, phosphoric acid, etc., that reach it in the electrolytic process by which the current is carried through the body, the eroded ions of the metal then being projected from the metal into the tissues in the same manner as described for the basal ions of drugs. Unlike them, the union of these caustic ions with the tissues does not produce an absorbable molecule but devitalizes the tissue with which it unites, producing a more or less non-absorbable material which must separate, if a heavy current or one of long duration has been used, as a slough that is more or less sterile according to the ion employed. After a weak current or one of short duration the detritus separates as a serous discharge. The surgical advantages of destroying or removing tissues in this manner are: bloodlessness; the sealing of blood-vessels and lymphatic spaces at the peripheries of the destroyed tissue, thus preventing operative re-infection when dealing with infected tissue; and relative painlessness. In the surface applications for mere sterilization and stimulation without the production of a slough, the advantages are controllability of action and a deeper penetration into crypts and follicles than would occur with the drug if the current was not used.

The Zinc Ion, (diffused from the positive pole.)—This ion is the most caustic of surgical ions. It may be diffused from a 1 or 2 per cent. solution of zinc sulphate, a zinc probe making contact, with the solution, or from the metal itself. The effect of a mild current when the liquid is used is to intensify and deepen

the effect of the solution alone. The metal is used in the form of a needle or probe, and for large *indolent ulcers*, as a plate. When the lines of flow are sufficiently concentrated a densely white slough is produced, of a depth and extent governed by the current and its duration. Wounds so produced heal readily and are but slightly painful unless situated in hypersensitive locations.

The Copper Ion, (diffused from the positive pole.)—The copper ion is less destructive than zinc, and is chiefly used to sterilize and stimulate healing of *sinuses*. It produces a green deposit in the tissues that is readily thrown off in the serous flow caused by the deposit, or it may be absorbed. An electrode for the treatment of sinuses with this metal may be improvised from copper wire.

The Silver Ion, (diffused from the positive pole,) has been very little used. The deposit within the tissues causes little irritation and may remain permanently, dissociated into an oxide, as a permanent blemish under the influence of light.

The Ferric Ion, (diffused from the positive pole), has been tested by us in malignant growths with negative results. Its brown deposit in the skin may become painfully evident to any physician who mistakenly used a steel needle as positive pole in the epilation of superfluous hairs. In one instance known to us the deposit was extracted by using a fresh needle as negative pole, after a rather prolonged application at the same spot, an instance of cathodic depigmentation.

CHAPTER IX

LOW VOLTAGE WAVE CURRENTS

THEIR PHYSICS AND PHYSIOLOGIC ACTION

Wave Action of Electric Currents—Explanation of Wave Action on Neuron and Muscle—Importance of Shape and Duration of a Wave—Wave Frequency in Low Voltage Currents.

In the preceding parts of this work we have considered the action of the waveless galvanic current only, for effects on the body that do not need variations in its flow and that are hampered by them. These effects are chiefly chemical, vascular or drug diffusing.

Wave Action of Electric Currents.—That quality of a current so undesirable in straight galvanism and diffusion of drugs; current variations and interruptions, is important in another therapeutic field, that of artificial stimulation of function in nerves and muscles.

It was about 1844 that Prof. Emil du Bois Reymond, of Berlin, announced the law of electric stimulation of neuron and muscle that remains today the true interpretation of neuromuscular electric stimulation and should be called the *wave action*. This law is as follows, in simple language.

A neuron or muscle is not stimulated by a weak current of electrons, but only by waves in this current, on either their ascending or descending slopes; the stimulation being proportional to the power of the wave interpreted as follows: the weaker the wave in milliamperage the higher must the voltage be to produce a given stimulation; conversely, the stronger the wave in milliamperage the weaker may the voltage be. Moreover, with a given milliamperage and voltage in a wave, the quicker the voltage rises the greater the stimulation.

Scanned closely, these facts are exact statements of the powers of all waves of substances or of energies that move in waves. Standing in the surf at the seashore, we all know that a small wave with a high crest will hit a harder blow than the same quantity or volume of water with a low crest; and, also, that a low wave must be a broad one to take us off our feet. Finally, we know that a wave with a given height and bulk will hit us harder if it has a steep front.

Explanation of Wave Action on Neuron and Muscle.—If, in a state of quiescence, the molecules of a neuron or muscle, the seat of the continuous, minute electric changes incident to metabolism and function, are suddenly thrown into another chemical formation by a foreign electric current with a flood crest, an immediate rearrangement of the ions of the part is precipitated, more or less violent and powerful in proportion to the volume of the wave and the height and sharpness of its crest.

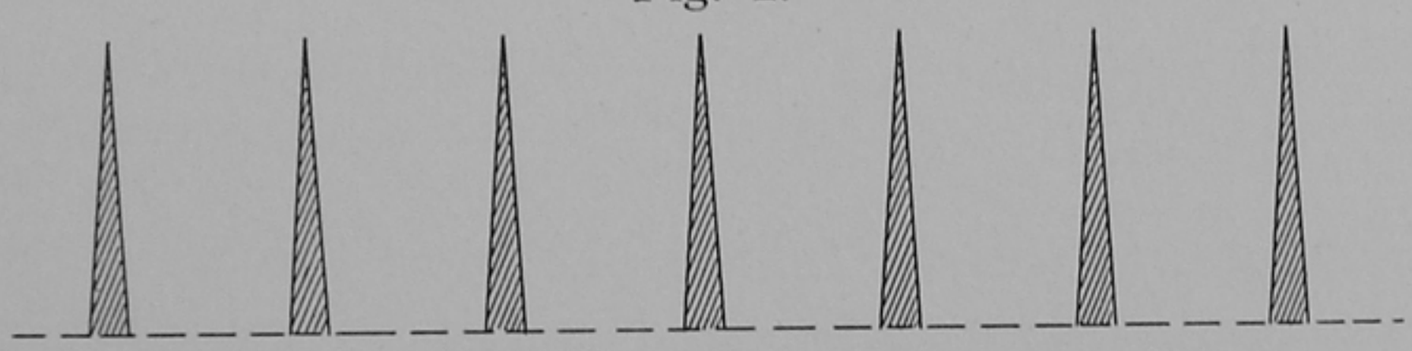
It is important to note that the effect of this wave on these tissues differs at the negative and positive poles. The neuron response is always greatest at the negative pole, in both health and disease. The muscle response is also greatest at the negative pole in health, but, when the muscle is cut off from its trophic center by disease or injury, the response becomes greatest at the positive pole of a galvanic current and remains so during the degeneration that follows severing its trophic supply and a part of the period of its re-generation. This latter response is therefore of diagnostic value.

The question arises: What is the explanation of this difference of polar wave action? Is it due to the wave of electrons being always from the negative pole, the action at positive closure being a weaker return wave crest of negative electrons into a void, as water fills a hole in its level; or is it due to its chemical nature at each pole, the negative wave being strongest in health because its ions are more stimulating to healthy neuron and muscle than the positive ions, and that positive ions stimu-

late a degenerating muscle fiber strongest? The latter theory seems at present the more plausible, and to offer the only explanation of the muscle change.

Importance of Shape and Duration of a Wave.—A result of the principles of all waves of power mentioned in the first part of this chapter is that both the shape of a wave, as it may be recorded by a proper instrument, and its duration are important in its therapeutic use. If the *shape* is irregular, as was that of the old faradic current, (Fig. 2), it is not a single wave but a series of irregular ones. Such a wave has a maximum of pain stimulation in a mixed nerve and a minimum of motor stimulation in spite of its height, the imperfect motor response being due to interference with each other by the wavelets.

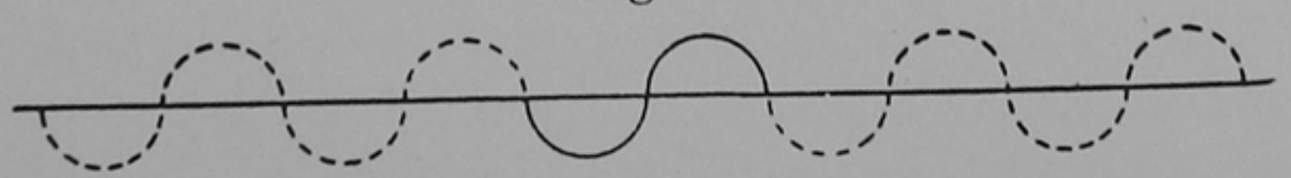
Fig. 2.



Faradic current wave

If the shape is a smooth one, without wavelets or too sharp a peak, as in the alternating current surge, (Fig. 3), we have a maximum of motor stimulation with a minimum of discomfort.

Fig. 3.



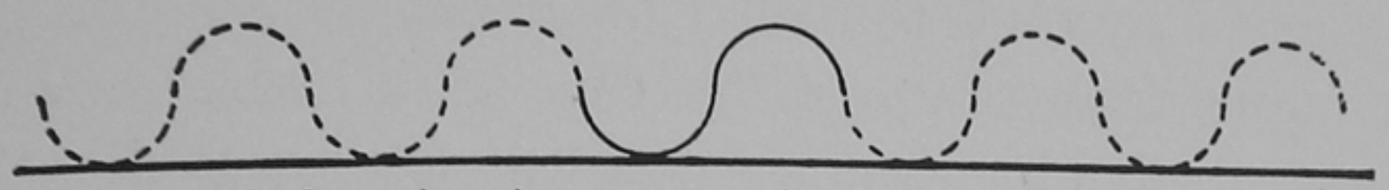
Galvanic sine wave (reversing polarity)

Waves differ in effect also due to their *duration* and *volume.* Since the faradic wave has an exceedingly slight duration, about one four-hundredth of a second, it is still used as a test in reaction of degeneration *because its brevity causes its response to be the first to disappear in nerve or muscle when the degeneration is present.*

Galvanic surging waves, that is, waves *without* reversal of polarity, produce vigorous contractions that are less painful

if the surge is smooth, (Fig. 4), and not mere makes and breaks in the current shown in Fig. 2, the amplitude of the contractions being due to their large volume and long duration. The chemical action makes them undesirable in some applications, particularly when a nickel-plated internal electrode is used as active pole, the plating being injured. Their chief use is in electrodiagnosis.

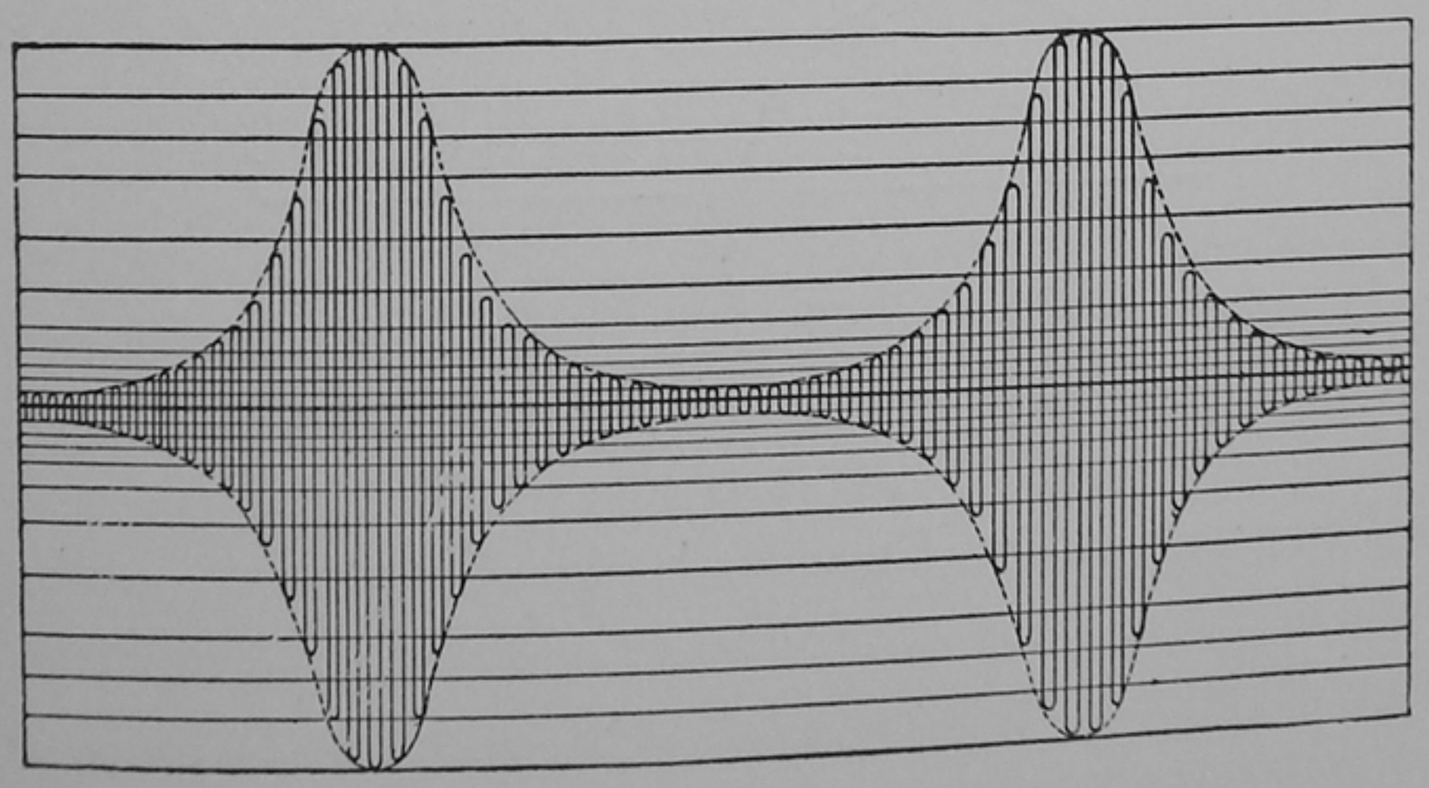
Fig. 4.



Galvanic sine wave (uni directional)

The alternating current cycle, (Fig. 3) made up of two waves succeeding each other in opposite directions, if smooth and with exactly equal crescendo and diminuendo slants, is least painful, and as its crest, duration, volume and frequency can be determined in the design of the generator and controlling device, it is the most useful type for general neuromuscular stimulation. These waves, moreover, alternate between positive and negative potentials with a *resultant total difference in polarity that is twice the height of each wave*, doubling the polar change in nerve and muscle, with consequent doubling of effect.

Fig. 5.



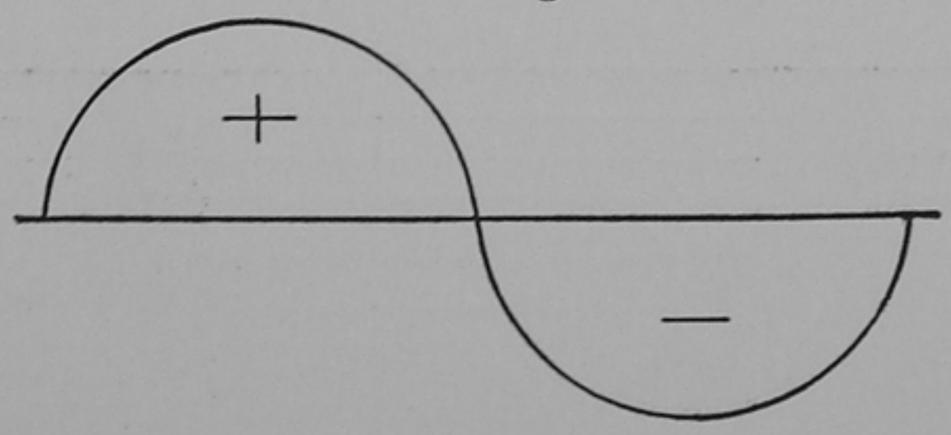
Surging Rapid Sinusoidal or Sine Wave Current

This current was re-introduced into medicine by d'Arsonval about 1890 under the name of sinusoidal, but had long been used

in a painful form of too low frequency produced by two coils in a box rotated in low gear by hand before the poles of a permanent magnet. What d'Arsonval contributed to the subject was the employment of electromagnets and a power drive, increase of the frequency of the waves to an agreeable and effective frequency, and explanation of the advantage of smooth alternating waves over the old faradic waves.

The galvanic current can also be made to flow in alternate waves of sinusoidal shape, (Fig. 6). This form of sinusoidal wave should always be distinguished in note by taking the word "galvanic." These waves produce the most powerful stimulation of nerve and muscle of all waves, due to their duration, volume and alteration. If carefully timed to least burning sensation on the skin they may not be especially painful *if the surface electrode or electrodes are sufficiently large and make perfect contact with the skin*, but no matter how perfect the technic there is some irritation of the skin that interferes with the comfort of subsequent applications. It is quite possible that the higher voltage and considerable milliamperage of the alternating surges of modern wave generators can replace them for most indications.

Fig. 6.



Galvanic Sinusoidal Current.

Wave Frequency in Low Voltage Currents.—The recent production of wave generators that not only produce waves with the desirable qualities indicated above, but permit selective variation of their amperage and surge them into tetanic stimuli applicable to different organs, has greatly extended the possibilities of wave current therapy in medicine, particularly in a sedentary population. The effect of such artificially produced exercise

of the skeletal muscles, in increased oxidation and elimination of waste, has been studied by physiologists, who have shown demonstrable effects even from slight contractions. A similar study of their effects on unstriated muscular tissue of internal organs has so far lagged, hence the need of the extensive treatment of this subject to be found in Part II of this work.

The frequency of contractions produced in a muscle by these currents is quite important.

In the first place, a muscle will not contract at all if the waves are too frequent to allow of individual stimulations, with sufficient rest between for relaxation. Yet this may happen nearly two hundred times a second, with complete contractions and periods of relaxation. Above this number per second they tend to fade, and at about 10,000 per second cease to occur. Above this frequency we have the absence of neuron and muscle stimulation characteristic of high frequency currents, though some wave effects are felt at times in imperfectly produced high frequency currents of much greater frequency, known as the faradic effects, when the trains of oscillations are spaced too far apart.

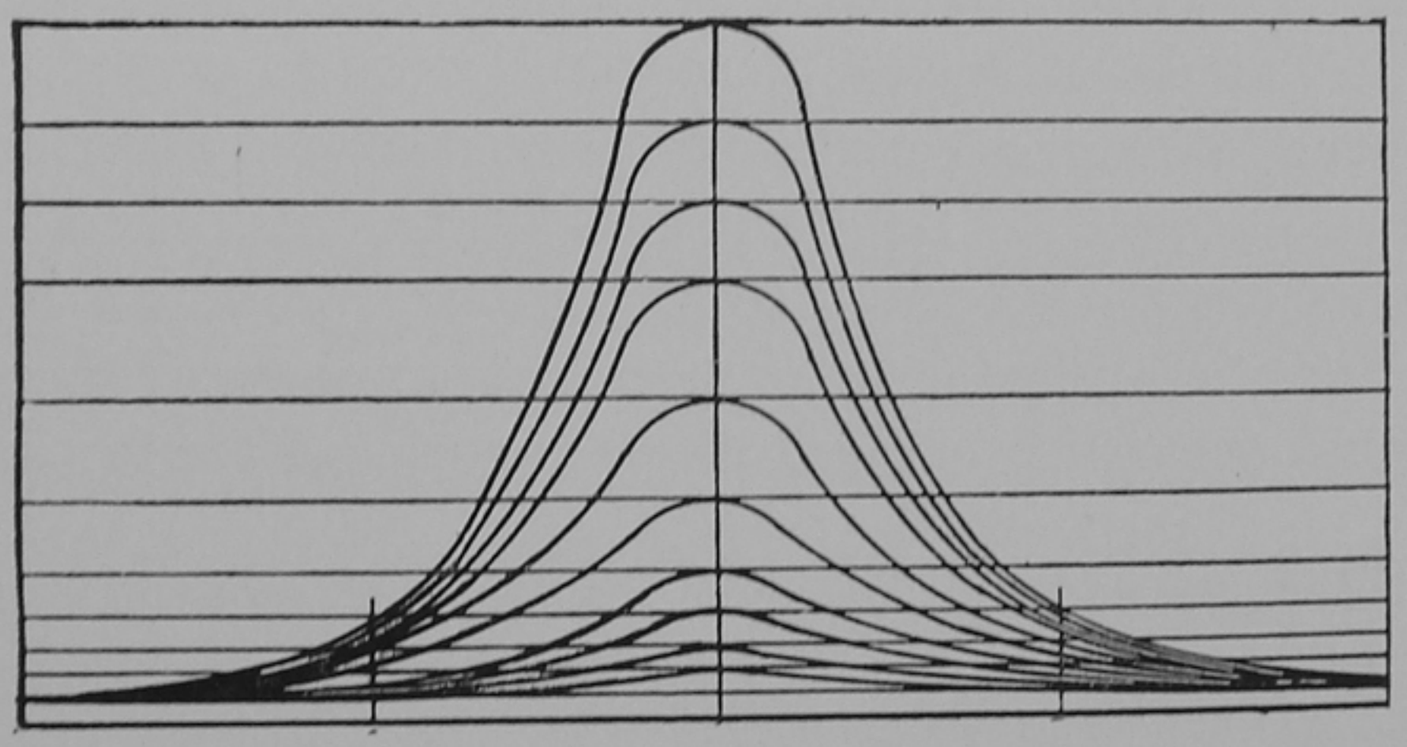
Low voltage waves may be placed in three classes in the matter of their frequency, each a distant therapeutic entity to the physician:

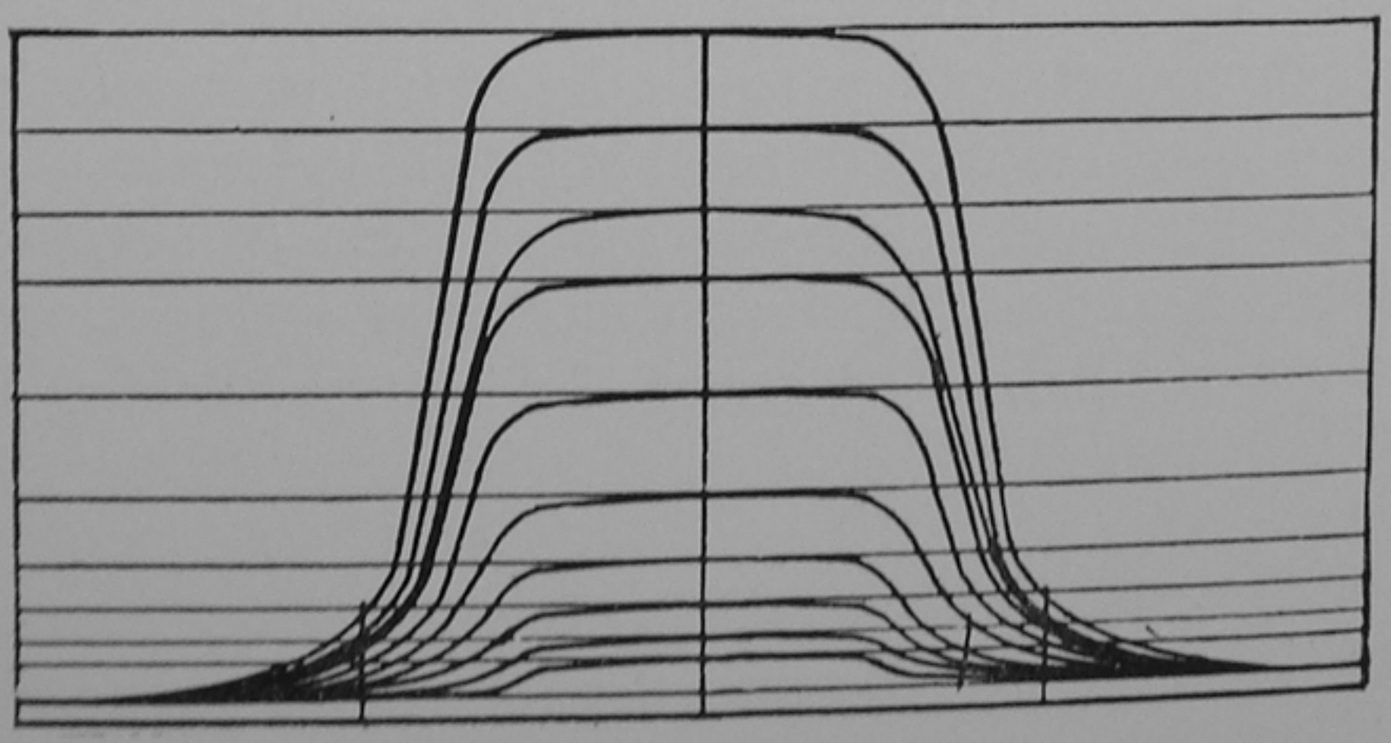
1. Single Waves. These are not used in actual treatment at present, though the older faradic batteries produced them by a pendulum mechanism. Save the single galvanic waves of minimal strength used in testing for reaction of degeneration, single waves are not as effective in producing ample contraction as a series of properly spaced waves, the latter producing a series of contractions that blend into a single stimulus with least pain.

2. Properly spaced sinusoidal waves, the basal waves of a surge, are themselves not as useful as when surged into super waves.

3. Surges of the last-mentioned waves, (Figs. 7 & 8,) the surges timed from about 10 per minute to about 70 per minute to correspond to the normal contraction rate of the organ, are the waves of greatest therapeutic value, in both skeletal muscles and the unstriated muscles of the internal organs. In the skeletal muscles they produce greatest stimulation with least fatigue. In unstriated muscles, the blending of many wave impulses into a surge is more likely to start a contraction in these sluggish fibers than either single waves, with the possible exception of the galvanic, or a tetanizing series without periodic remissions.

Figs. 7 and 8





CHAPTER X

ELECTRODIAGNOSIS

Scope of Electrodiagnosis—Wallerian Degeneration—Reaction of Degeneration—Faradic Test—Galvanic Test—Condenser Test.

Electrical tests for diagnostic purposes are limited to two investigations, the principal one being for *exact, scientiflc evidence of the present existence or recent occurence of an injury to a motor nerve or to the anterior horns of the spinal cord, or of an infectious or toxic degeneration of the same parts.*

The only other test of practical importance is one occasionally used by otologists in which a somewhat similar degeneration of the auditory nerve may be detected.

The motor nerve and muscle test is even more important than indicated above, for it establishes the differential diagnosis between the cerebral origin and the peripheral origin of a paralysis, such, for instance as that of the seventh nerve, where the other symptoms may be identical, though in the one case due only to an exposure neuritic attack in a rheumatic person and in the other to be a cerebral embolism.

This test enables the industrial surgeon to make a definite diagnosis and prognosis in injuries to peripheral nerves and the spine, and to detect malingerers.

It enables the medico-legal expert to detect and scientifically measure a peripheral nerve or cord injury and its probable date of occurence; and it enables him to assert scientifically that an alleged peripheral nerve injury presents no reactions that should be present in an injury of a definitely serious character at the time of examination, and thus may be feigned. A skilled use of the test should lead to a more scientific adjudication of the many suits in the courts for damages.

Wallerian Degeneration. — The anatomico-physiologic reason for the definite character of this test is the presence of trophic or nutritive neurons in motor nerves that convey the trophic influence or power from the secondary motor center in the cord or medulla to the nerve itself and to its end organ. An injury of the nerve sufficient to interfere with the transmission of voluntary motor impulses will also injure these trophic fibers of the nerve, arresting the transmission of trophic influence below the point of injury. As first pointed out by Waller, an English physiologist, a profound change, known as Wallerian degeneration, occurs in the part of the nerve peripheral to the point of injury. The best description of this pathologic change is to be found in a work by Prof. Wilhelm Erb a German physiologist who first discovered the change electrical responses due to it and named by him the Reaction of Degeneration, shortened for recording purposes to R D, and as this subject is of extreme importance in industrial surgery and legal medicine his description is appended:

"The first result of such a traumatic lesion is the degeneration of the peripheral portion of the nerve. Within a few (two to four) days the medullary sheath coagulates and breaks up into clumps, drops, granules, a process which spreads quite rapidly and leads to the formation of masses of granules and granular corpuscles. This is associated with softening, degeneration and destruction of the axis cylinder (neuraxon), together with marked proliferation of the nuclei in the sheath of Schwann. Gradually a large part of the products of degeneration is absorbed and the sheath of Schwann merely contains a homogeneous protoplasmic mass. This process spreads very rapidly from the site of the lesion toward the periphery into the finest ramifications of the nerves.

"These appearances are also associated with changes in the neurilemma; apart from the circumscribed traumatic neuritis at the site of the lesion, an increase in the nuclei in the sheath of Schwann occurs in the entire peripheral portion of the nerve,

together with a considerable accumulation of cellular elements in the endoneurium and perinurium; these become transformed into spindle cells and connective tissue, which increases to a marked extent, forces itself in broad between the individual bundles of nerve fibers and into the latter themselves, leading finally to cirrhosis of the nerve. How this hyperplasia of the connective tissues occurs is a question; whether from the irritation produced by the products of degeneration of the nerves or from paralysis of vasomotor and trophic fibers is still undecided.

"After a shorter or longer period, according to the form and severity of the lesion, more or less complete regeneration of the nerve occurs. The unsettled question as to the manner in which this is effected may be left to the histologists.

"Parallel with the changes in the nerves are analogous histologic changes in the muscles supplied by them. The first phenomenon noticeable is a progressive diminution in the size of the muscle fibers, which becomes distinct during the second week, and is very considerable after the lapse of a few weeks, and, in incurable cases, leads to complete disappearance of the fibers. The transverse striation becomes somewhat indistinct, but fatty or granular degeneration of the fibers is observed only exceptionally. A considerable increase in the number of the muscle nuclei, which are accumulated in masses and chains, occurs at the same time; finally a chemical change in the muscular substance develops and is manifested by the greater tendency of these muscles to the development of so-called waxy degeneration.

"Cellular infiltration and connective tissue proliferation in the interstitial connective tissue of the muscles also occur, and the terminal result is an evident cirrhosis of the muscle, whose atrophic and small fibers appear surrounded, after the lapse of a few weeks, by large, tough bands of fibrous tissue. In incurable cases the entire muscle is transformed into connective tissue, which may afterward become the seat of a deposit of fat.

"As soon as the regeneration of the nerve occurs the muscle is slowly restored to its normal condition, though this requires a

long time. Experimental and clinical investigations have proven that these degenerative changes are the main cause of R D."

The facts thus stated by this authority, who probably advanced our knowledge of the galvanic current further than any of his contemporaries.

Reaction of Degeneration.—If an abrupt current wave be made to traverse a normal motor nerve the sudden polarization, or rearrangement of the ions of its molecules will cause its muscle to contract, just as a false telegram may be sent to New York over a Philadelphia-New York wire by cutting it at Trenton and attaching a battery and sending key to the cut end of the New York part.

Carrying the analogy further, if the copper or iron wire after being cut could develop a diseased arrangement of its molecules that weakened or extinguished its ability to conduct a current, and this had a deleterious effect on the receiving apparatus at New York, we would have an exact duplication of the condition existing in a motor nerve and muscle during Wallerian degeneration.

In the nerve this degeneration shows in a R D by a mere fading out of responses to both faradic and galvanic currents in about two weeks after the injury.

In the muscle, the degeneration reactions are different and more interesting, due to the fact that the degeneration of an end organ differs in its characteristics and products from the degeneration in its conductor because of difference in constituents. The sharp wave of brief duration, the faradic, fails to produce a response almost as quickly as in the nerve. But the chemical powers of the galvanic current wave instead of showing less action causes early increase in stimulating effect, a *quantitative increase* of irritability being found for a time; in other words, a weaker current will produce the first switch, or minimal contraction than in a normal muscle.

The galvanic wave will also exhibit in RD in the muscle an *inverted formula of polar response*. Where, in a normal muscle the first twitch is found at the negative wave, (the basal ion concentration being most stimulating), in Wallerian degeneration the positive wave, with its acid concentration, produces the first twitch.

But the most characteristic feature of RD is the *qualitative change* in muscle response. Instead of a quick, vigorous twitch we will see a sluggish, wave-like contraction.

Degeneration reaction, therefore, may be summarized as follows:

In nerves, failure of both currents is complete Wallerian degeneration or lessened response in incomplete cases.

In muscles,

I. Loss of faradic response.

II. Quantitative increase in response to the galvanic wave.

III. Inversion of normal formula, the positive wave causing the first twitch.

IV. Qualitative change in galvanic response.

V. Loss of special activity at motor point, as this is the point of nerve supply, response in the latter being abolished.

Technic of Examination for RD. Faradic Test.—This test is always made first, and to a nerve point, the purpose being to ascertain if the nerve or muscle will fail to respond to a current strength capable of producing the first quiver or twitch at the corresponding motor point on the healthy side of the body. A slight difference between the two will indicate the most delicate degree of RD, for in any but the slightest injuries the faradic response is entirely absent.

With the positive pole of the faradic apparatus attached to a broad pad on a distant part of the body, a moist, half-inch

negative electrode is applied to the motor point and the current increased gradually from zero to the point where a quiver of the normal muscle is noted. The strength is noted, and the test made to the corresponding point on the affected side.

Galvanic Test.—This test is applied to the muscle, the same electrodes being used as for the faradic test, though a broader contact is made with the active electrode to the belly of the muscle instead of to its motor point. Where many examinations are made the transfer from one current to the other is conveniently made by means of a switch. Notations of the presence of qualitative change and reversal of the normal formula are made during the examination for quantitative change. (Figs. 9 and 9a)

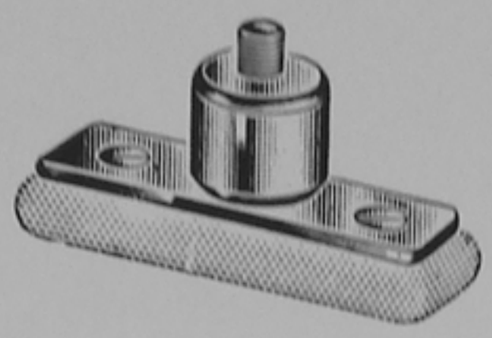
Condenser Test.—Quantitative tests may be made either by the older method of foot-switch interruptions of the ordinary galvanic current or by the newer method introduced by Sir Lewis Jones in which accurately graded condenser discharges are sent through the muscle, a modification of the latter apparatus being made in this country. The latter have all the characteristics of the galvanic wave, with the advantages of greater accuracy of measurement in comparative and repetitive tests. When using the ordinary galvanic wave the foot-switch is preferable to one in the handle of the electrode unless the latter has a very weak spring, as the movement of switch closing will sometimes change the strength of the current by altering the pressure of the electrode on the skin.

Fig. 9.



Diagnostic electrode, for electro diagnosis (muscle testing) to determine degree of local disability.

Fig. 9a



Adjustable small top for more definite localization of defective nerve areas.

Motor points of the more important nerve exits as a guide in diagnosis and treatment. Figs. 10-11-12-13-14-15.

Fig. 10.

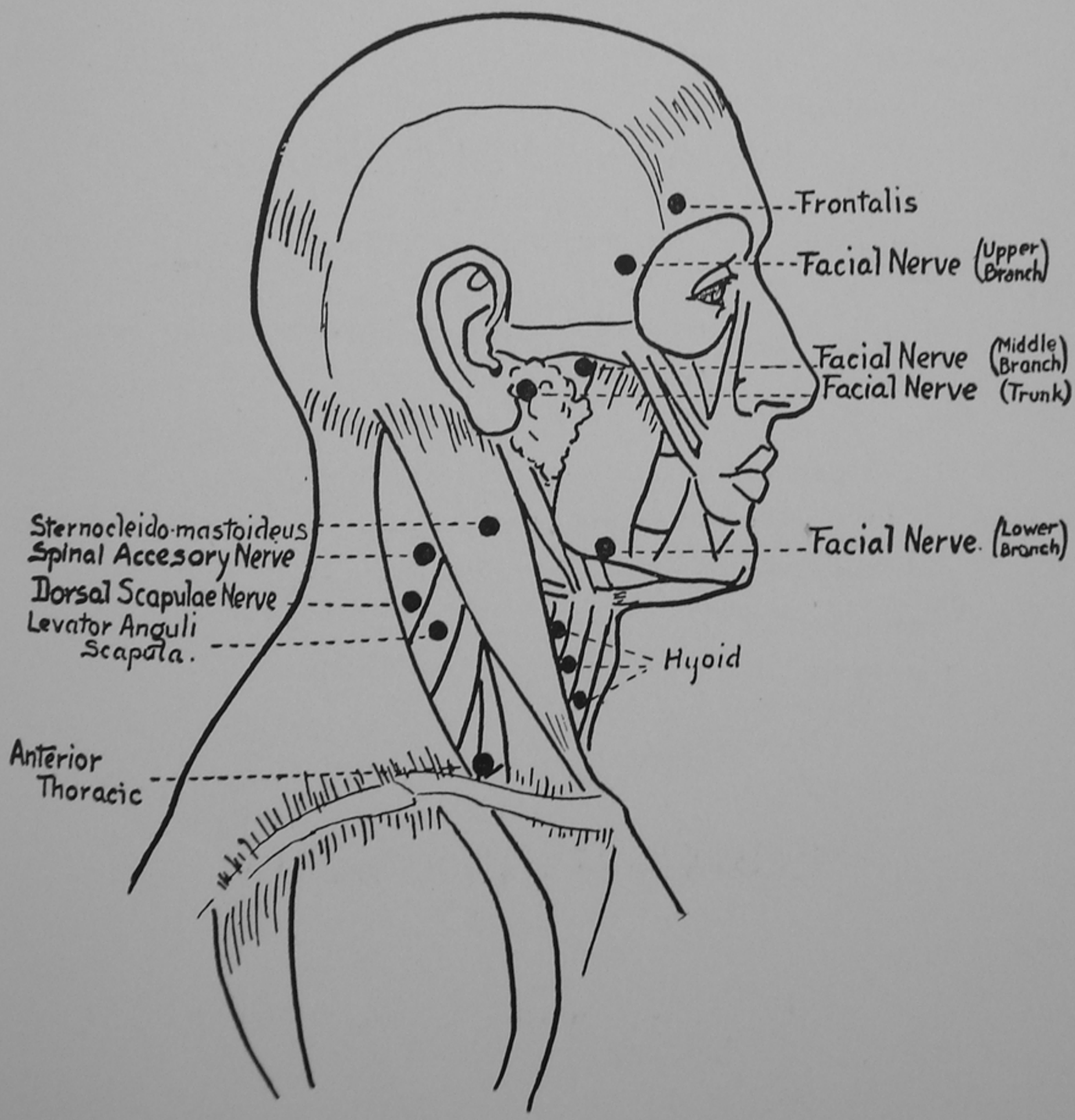


Fig. 11.

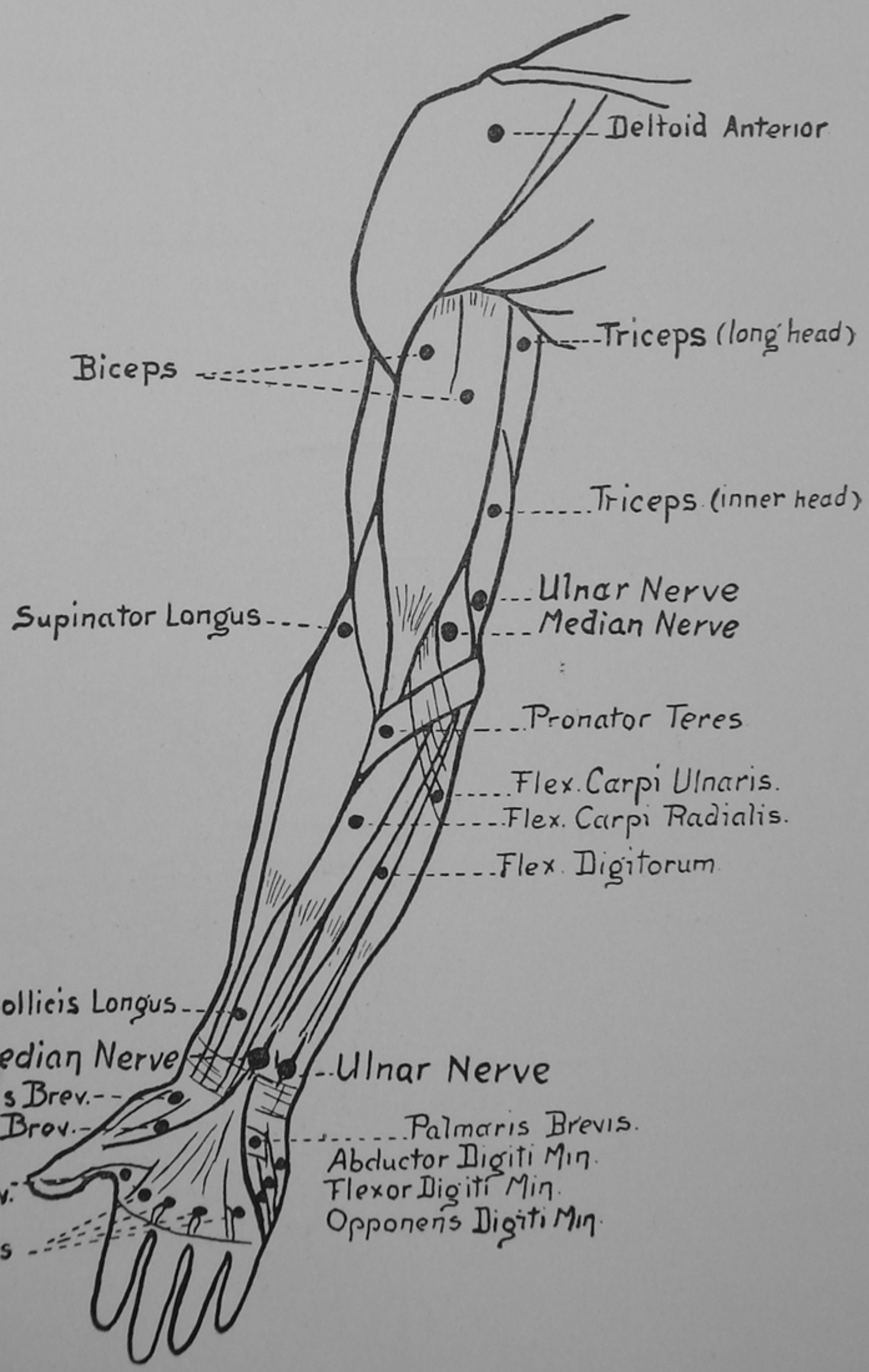

Deltoid Anterior
Triceps (long head)
Biceps
Triceps (inner head)
Ulnar Nerve
Supinator Longus
Median Nerve
Pronator Teres
Flex. Carpi Ulnaris.
Flex. Carpi Radialis.
Flex. Digitorum
Flex. pollicis Longus
Median Nerve
Ulnar Nerve
Abductor Pollicis Brev.
Flexor Pollicis Brev.
Palmaris Brevis.
Adductor Pollicis Brev.
Abductor Digiti Min.
Flexor Digiti Min.
Opponens Digiti Min.
Lumbricales

Fig. 12.

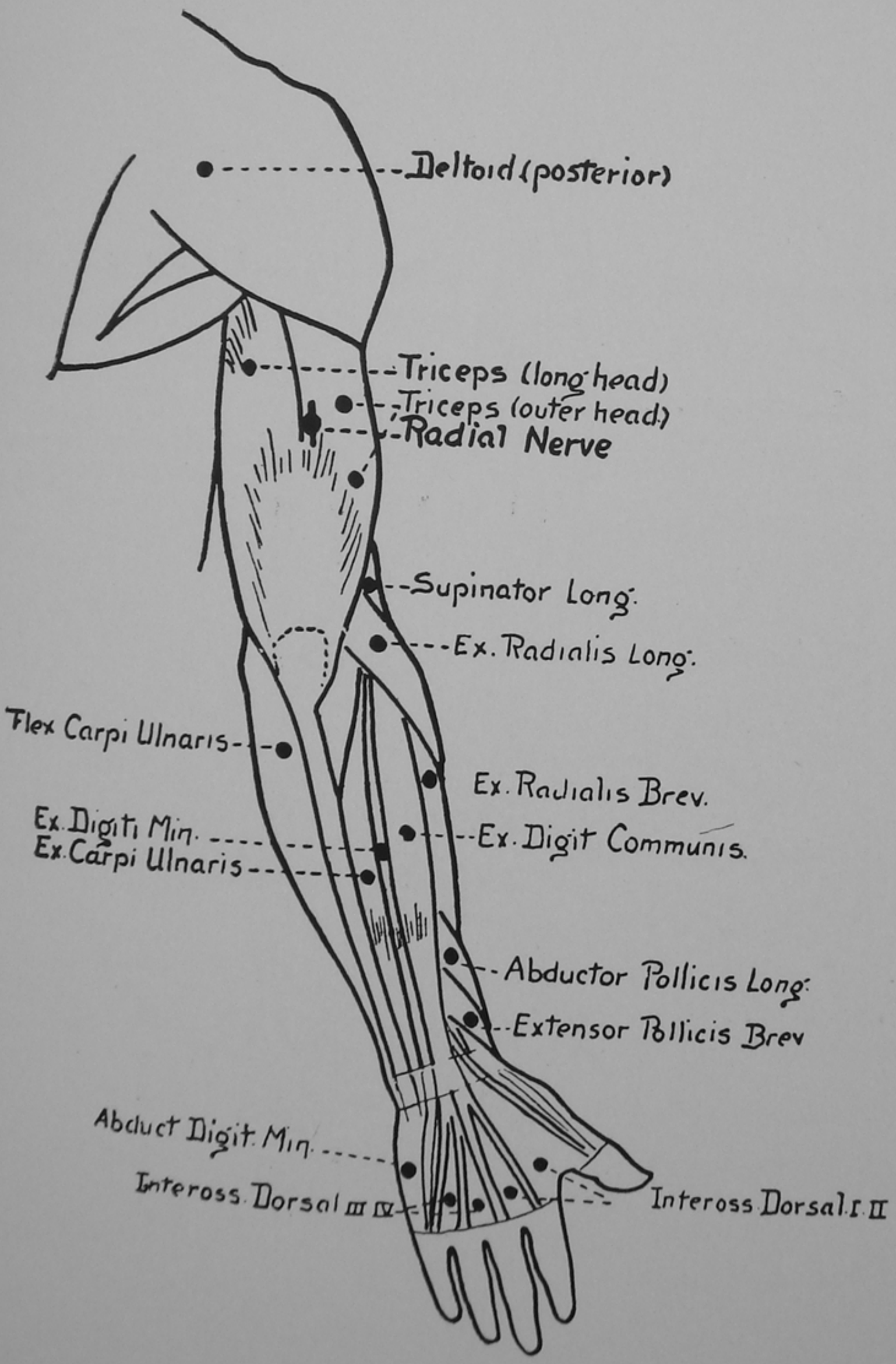

Deltoid (posterior)
Triceps (long head)
Triceps (outer head)
Radial Nerve
Supinator Long.
Ex. Radialis Long.
Flex Carpi Ulnaris
Ex. Radialis Brev.
Ex. Digiti Min.
Ex. Carpi Ulnaris
Ex. Digit Communis.
Abductor Pollicis Long.
Extensor Pollicis Brev
Abduct Digit. Min.
Inteross. Dorsal III IV
Inteross Dorsal I. II

Fig. 13.

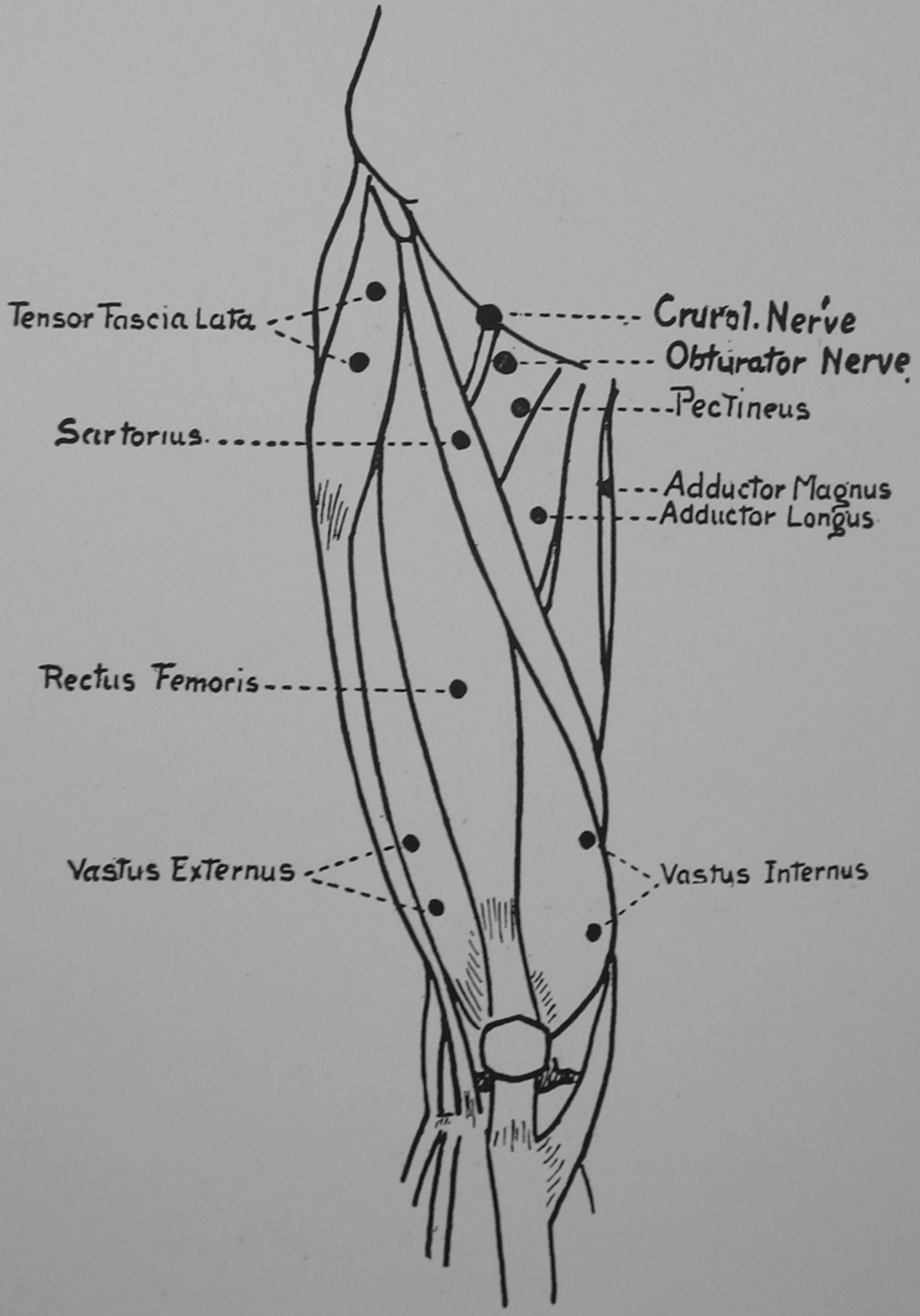

Tensor Fascia Lata
Sartorius
Rectus Femoris
Vastus Externus
Crural. Nerve
Obturator Nerve
Pectineus
Adductor Magnus
Adductor Longus
Vastus Internus

Fig. 14.

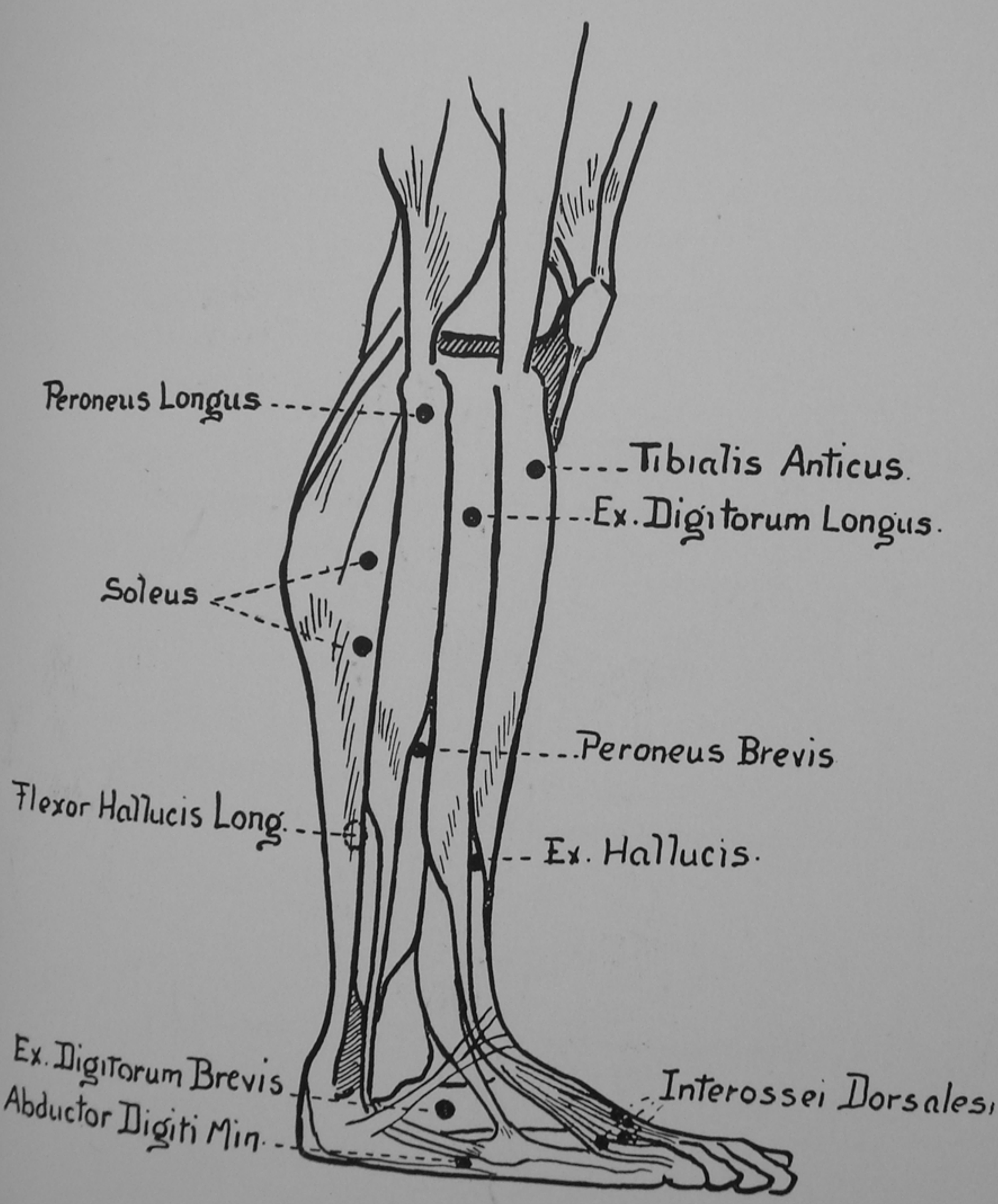
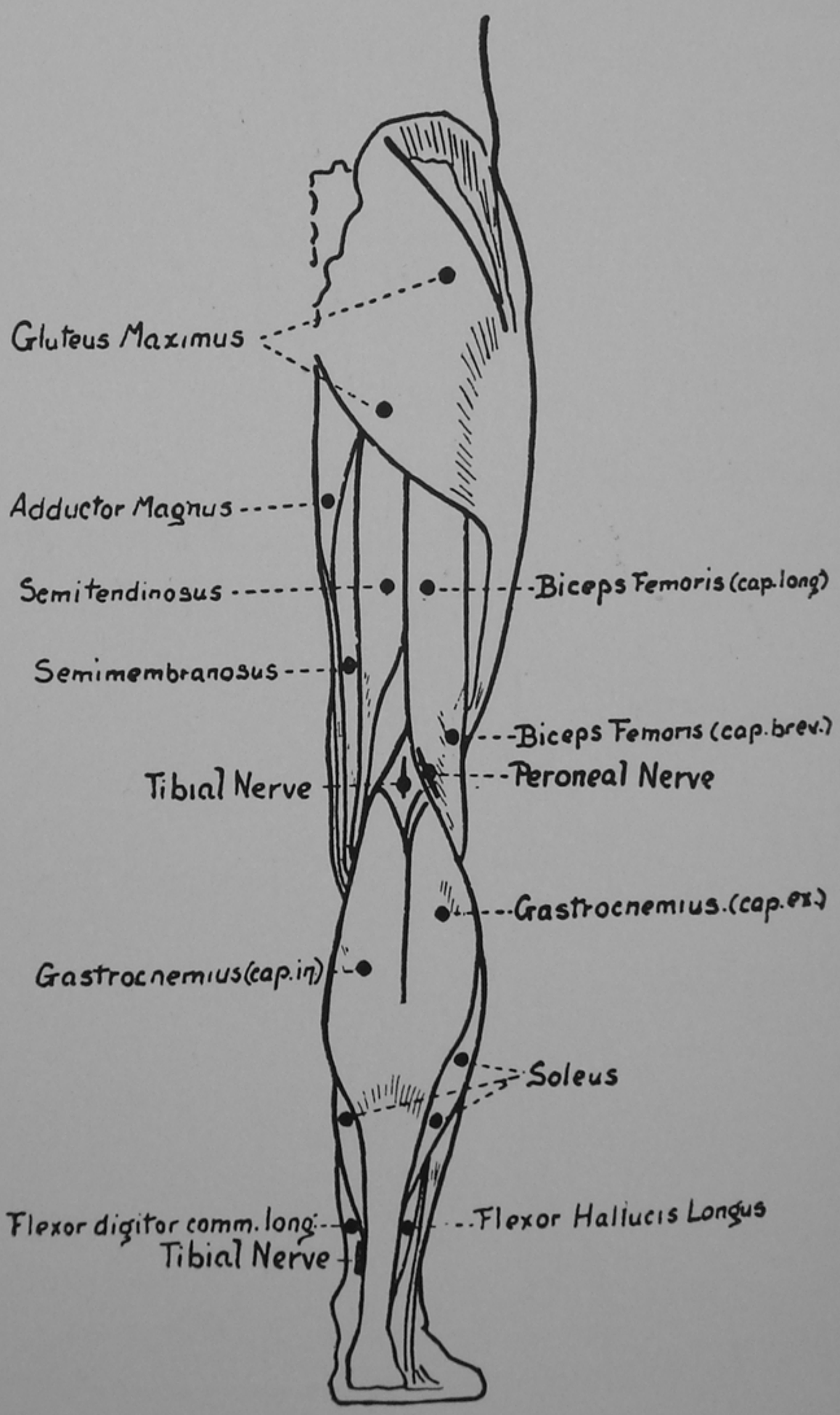

Peroneus Longus
Soleus
Flexor Hallucis Long.
Ex. Digitorum Brevis
Abductor Digiti Min.
Tibialis Anticus.
Ex. Digitorum Longus.
Peroneus Brevis
Ex. Hallucis.
Interossei Dorsales.

Fig. 15.


Gluteus Maximus
Adductor Magnus
Semitendinosus
Biceps Femoris (cap. long)
Semimembranosus
Biceps Femoris (cap. brev.)
Tibial Nerve
Peroneal Nerve
Gastrocnemius. (cap. ex.)
Gastrocnemius (cap. in)
Soleus
Flexor digitor comm. long.
Tibial Nerve
Flexor Hallucis Longus

It would be very convenient to have a table of galvanic wave milliamperage and condenser wave microfarad strengths for each motor point in the average individual, but this is impracticable owing to variations in overlying adipose tissue, etc. The current required in the corresponding part on the normal side must be taken as a control standard for an individual. The strengths vary from ½ to 4 or 5 milliamperes in plain galvanic waves and from .01 to 2 microfarads in the muscle testing condenser.

With the plain galvanic current, the interruptions are made with the weakest currents firsts, increasing until the first twitch is noted. Stronger currents are not only more painful but splash through to the other muscles, complicating the test.

As stated before, a negative wave produces the first twitch in a normal muscle, while in RD the positive wave may equal or surpass the negative. If the switch is kept closed for a few moments with a stronger current a decided twitch may be noted at opening the circuit in RD, the positive opening contraction sometimes being the strongest in this condition.

With tests made at intervals in the progress of the disease or during recovery from the traumatism, the results recorded at each test will be helpful in prognosis and most convincing on the witness stand.

CHAPTER XI

INTERNAL APPLICATIONS OF THE GALVANIC CURRENT AND SURGICAL IONIZATION

In preceding chapters the principles of galvanic applications have been considered and the technic of the surface electrode. It remains to consider the technic of this current within body cavities and in the substance of growths. It is evident that the chemical nature of this current gives it possibilities of relief quite different and at times greater than non-chemical currents and, save for internal diathermy electrodes, possibilities of greater mischief when wrongly used.

This possibility of unnecessary trauma in both galvanic and diathermic applications within cavities in non-malignant cases is increased by the comparative lack of sensitiveness in the vagina and uterus particularly, and to a less degree in the rectum. A current that is scarcely felt when the active electrode is in the upper vagina or middle rectum will startle the patient *if the electrode is allowed to slide down to the opening of the cavity*. This shows the need of two precautions:

I. An internal galvanic application should not be gauged in dosage entirely by the patient's sensations but rather by the physician's knowledge of its effect when observed externally with the same strength, concentration and duration.

II. On account of the extreme sensitiveness of all muco-cutaneous junctions, internal electrodes should always be held steadily in position by the physician himself during short applications of a galvanic or other low volt current, or compelled to remain in position during longer ones by the handle being prevented from sliding out, in vaginal and rectual applications, by sand bags piled to limit its motion or by being held in place by some sort of electrode holder lying on the table or chair between

the patient's buttocks. The value of light shanks to internal electrodes is evident. The authors regard a holder for an internal electrode that is large enough to rest on the floor as unwieldy.

A small ionization electrode is held immobile in a cavity or sinus by being guyed in place with a strip of adhesive plaster, preventing even the smaller shocks in a waveless application.

SPECIAL APPLICATIONS

The particular diseases or illustrative cases mentioned in this chapter in describing special applications are not intended to be a comprehensive list of the possible uses of the galvanic current in medicine and surgery. They are intended to illustrate the application itself, and will doubtless suggest other possible therapeutic uses to the physician or surgeon who has mastered the technic and actions of this current.

Readers interested in the treatment of malignant growths by direct current coagulation and ionization are referred to a recent work, "Practical Electro-Therapeutics and Diathermy" (Massey, 1924), in which the latest technic of this subject is given.

CHAPTER XII

GENERAL SURGICAL APPLICATIONS OF THE GALVANIC CURRENT

Sterilization of Cysts—Accessible Tubercular Deposits and Chronic Abscess Cavities—Stimulation of their Healing by Zinc and Mercury Ions.

This use of the positive pole of the galvanic current is best described in the details of its employment in the several conditions mentioned below.

CYSTIC GOITER.—The method for the radical cure of cystic goiter to be described originated with us, and has been employed for a number of years with uniform success. The chief difficulty in its application is the uncertainty attending the diagnosis of cystic goiter in some cases, where hypertrophied parenchymal tissue is so elastic that it resembles a cyst on palpation. Uncertainties of this nature may be cleared up by aspiration with a hypodermic needle, and abandonment of the treatment if no fluid is secured.

The method is the establishment of free drainage of the cyst by a small opening in the sac through the overlying skin, converted into a temporary sinus by negative electrolysis, through which antiseptic and cauterant ions are diffused from a zinc probe amalgamated with mercury acting as positive pole. A waveless galvanic current is of course used to lessen the pain of the application. The sac walls and cavity are obliterated gradually by repeated small diffusions of the two ions at intervals of three days, these diffusions at such intervals ensuring absolutely against septic infection of the cavity during the treatment. As the cavity shrinks under the treatment a greater interval may be allowed between treatments, which are also lessened in strength until they become but slight additions to the probing to keep

the opening patulous until final healing, which may occur in seven to ten weeks, with a very small resultant scar. There has been no rise of temperature or untoward symptom of any kind in the cases treated.

Technic of Application.—With the patient lying on a large dispersing pad, a direct opening may be made by a bistoury into an undoubted cyst, under local anesthesia, the fluid evacuated and an amalgamated zinc probe of suitable size inserted into the cavity and the mercury and zinc ions diffused exactly as described for the treatment of sinuses and tuberculous cavities.

Or, in cases in which the presence of a cyst is somewhat doubtful, an aspirator needle may be made the negative pole to enlarge its opening into a sinus by previously attaching a fine wire to it for conduction of the current after the liquid has been evacuated and the needle removed from the syringe. If the aspiration shows no liquid the needle is withdrawn and the treatment abandoned, as electropuncture is of no service in non-cystic goiters. If liquid is found, a current of 5 to 15 milliamperes is turned on gradually and maintained for fifteen minutes to create a sinus, the polarity of the active electrode is then changed to positive, a fine zinc needle coated with mercury being inserted and a current of from 3 to 15 milliamperes employed for another fifteen minutes.

It is sometimes difficult to insert the positive needle until the tiny skin slough comes away, after which it is readily inserted painlessly if a drop of cocaine or novocaine solution is previously placed on the opening. The small wound is dressed with diluted zinc oxide ointment, 1 part to 10, on gauze, and the patient remains ambulant.

Surgical Tuberculosis.—By surgical tuberculosis is meant any tuberculous focus that is accessible to direct local treatment with safety to the patient.

Surgeons who interest themselves in physical therapy and who take the trouble to secure the proper apparatus for ionization and to master its simple technic, will doubtless find a broad

field for its use in a variety of tuberculous foci in open sinuses and in unopened deposits that may be reached by incision; but the data on which these paragraphs are based is limited to tuberculous glands of the neck, a number of which were reported in the work cited and to a more recent case of bone abscess of tuberculous origin.

The hypothesis on which the method is based is that the removal of a deposit of living bacilli is best undertaken in such a manner that the fresh wound made shall be sealed against their operative reimplantation, but it was later seen that even more was done by the mercury ion in re-establishing the health of the patient. Just what this is must be left to the physiologic chemist. None of these cases happened to be treated also with the ultraviolet ray, but this valuable procedure may be employed concurrently, and it is believed that the combination of the two would render special hospitals for these patients unnecessary in future.

The technique is practically the same as that described for systs and sinuses except that in these cases, the chronic abscesses and sinuses being what were known to the older surgeons as "cold abscesses" much more current may be employed at first to hasten results as little or no pain is produced. As the sinus or chronic abscess loses its "cold" characteristics and assumes those of an ordinary wound, under repeated applications, the current will have to be cut down and a drop of anesthetic solution applied to the opening some minutes before insertion of the electrode. The following case of bone tuberculosis may be cited as illustrative of the possibilities of the method in other than cervical adentis, the patient being in excellent health at present writing, eight months after cessation of treatment:

An emaciated, anemic woman of 38 years of age applied for treatment January 5, 1926. She had had tuberculous sinuses in the left leg since early girlhood, and had been operated on four years ago for tuberculosis of the left hip bone. Three sinuses had refused to heal in spite of skilled surgical attention.

Examination showed large scars at the site of operation and three open sinuses admitting probes to roughened bone, one in the upper portion of the left buttock, one at the junction of buttock and thigh, and one in the lower thigh just above the popliteal region. Treatment was begun with 15 milliamperes from zinc-mercury probes, thirty-one such applications being given during the following three months with decreasing milliamperage and frequency, when the sinuses closed, with greatly improved health, the patient resuming her occupation. Bone spicules were lifted from the openings from time to time.

Sinuses and Ulcers may be readily sterilized and stimulated into healing wounds by the zinc ion surgical technic described for cysts and surgical tuberculosis.

ZINC ION DESTRUCTION OF BENIGN TUMORS WITHIN CAVITIES

This is most useful and best illustrated by the treatment in office applications of benign growths within the nasal cavity, both hemorrhagic and non-hemorrhagic. A well-grounded suspicion of malignancy should bar this piecemeal treatment and dictate a single massive application, but benign growths of any size may be gradually destroyed by the minor method. The technic of the latter is as follows:

The active electrode, of zinc, is the size of a small knitting needle, five or six inches long, filed to a sharp point and curved slightly to reach the growth accurately. It is insulated freshly at each application by covering it thinly with fused sealing wax over a Bunsen burner except a quarter of an inch at the tip, the thin covering permitting its accurate insertion into the tumor to the depth of its uncovered part under direct illumination, after cocainization. Holding it in position after insertion, it is then guyed in place by a strip of adhesive plaster over its end attached to the face or forehead, and its light wire conductor is connected with the positive pole of the generator.

With a suitable dispersing electrode on the back, the current is turned on very gradually and without shock until 10 to 20 milliamperes is attained, which is continued for twenty minutes. The current is then turned off as slowly as it was turned on.

In hemorrhagic cases the applications may be repeated tri-weekly or oftener; in non-hemorrhagic tumors once or twice a week. Shrinkage sufficient to make the nostril patulous may be looked for after the first few applications, with eradication following later.

CHAPTER XIII

NEGATIVE POLE ELECTROLYSIS AND AS AN ASSISTANT IN DILATING STRICTURES.

Strictures of the Urethra—Oesophagus and Stenosis of Uterine Cervix.

Stricture of the Urethra.—There has been much wasted literature on the treatment of stricture by the negative pole of the galvanic current. In the first place, stricture of the male urethra is said to be not as frequent since the disuse of caustic applications. We also know that negative electrolysis is *as caustic as any alkaline ions applied otherwise.*

There is no doubt whatever that negative electrolysis will destroy cicatricial tissues if sufficiently strong and concentrated. But the final result of such vigorous treatment will not be different from that of other caustics, namely: increased stenosis after healing.

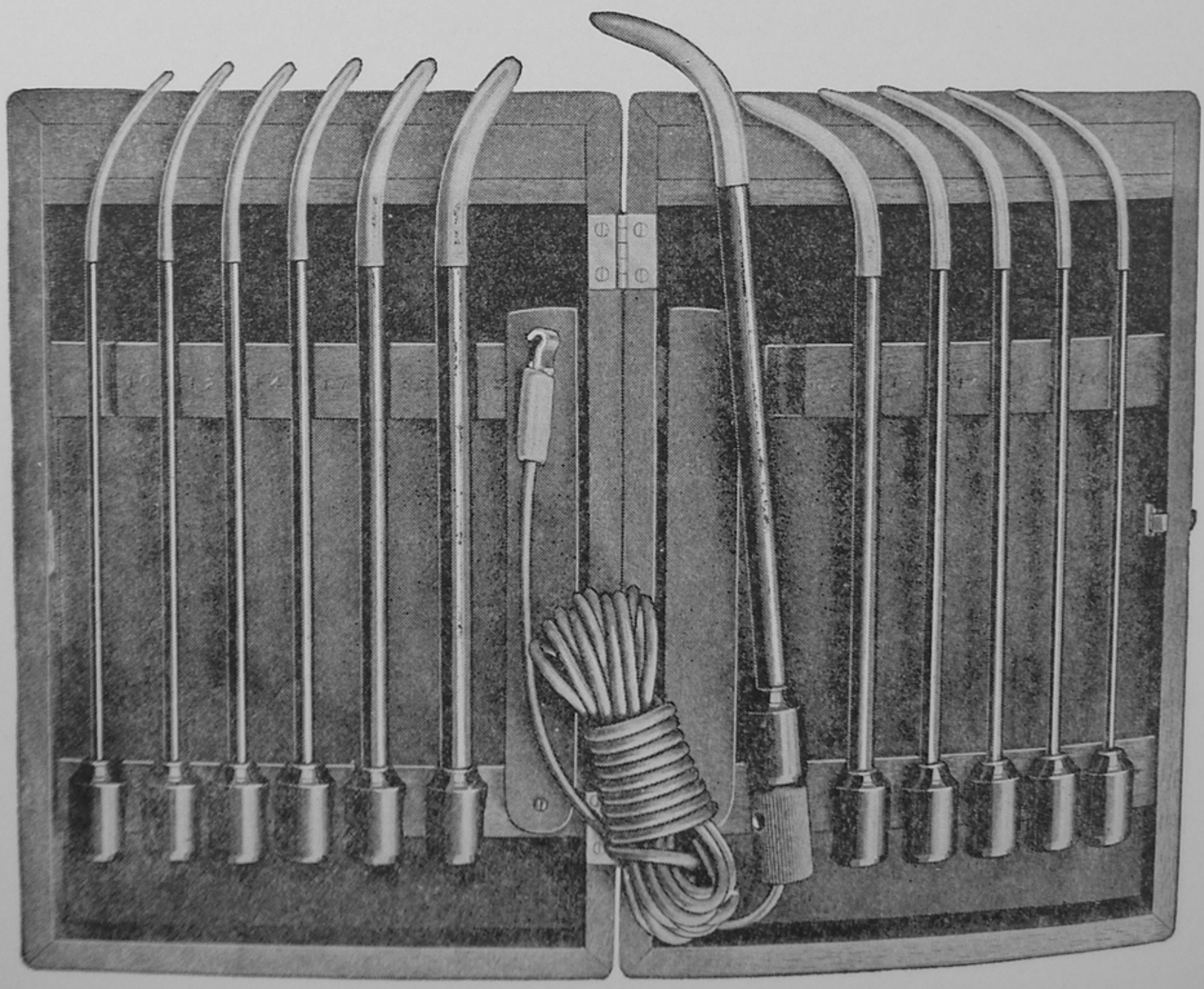
The value of negative pole water-and-alkali attraction, in the minute dose proper as an assistant to mechanical dilation, is a different question. From 1 to 5 milliamperes confined by insulation to the dilating tip will greatly assist by lubrication and have a slight sclerolytic action; and if not held immovably at one spot more than the fraction of a minute, will not cauterize.

The operation consists of first having an urethal sound used for the purpose of determining the size of the stricture and then selecting an urethal electrode one size larger than the sound that can be passed without stretching. Then place a surface electrode (4 x 5 inches) over lumbar region attached to positive pole. After proper antiseptic precautions have been taken, pass the urethal electrode until it seems to impinge in the area

to be treated and then turn on current to the amount of not over five milliamperes using very gentle pressure, but not force. If the electrode selected is not too large after two to five minutes the instrument will gradually go through the stricture. Turn the current off slowly before removing electrode to prevent an unpleasant shock. Repeat the process within seven to ten days using a larger sound and electrode and continue at intervals until the desired calibre is reached. See Fig. 16.

Stenosis of Uterine Cervix is treated by the same technic, only six or seven milliamperes may be used, a most valuable remedy for a large proportion of cases of sterility and dysmorhoea.

Fig. 16.



The same may be said of *stricture of the lachrymal duct*, but here a half milliampere will be sufficient.

In stricture of the oesophagus the current may be increased to 5 or 7, or even 10 milliamperes in accordance with the greatly increased active surface of the bulbs over which the current is distributed, giving distinct aid to the dilation.

CHAPTER XIV

THE GALVANIC CURRENT IN DERMATOLOGY

Epilation—Positive Pole Coagulation—Negative Pole Depigmentation—Negative Pole Destruction of Skin Varicosities—Port Wine Mark.

Epilation.—The negative pole is of course used for the active electrode, and the insulated kind of needle is recommended, as with this needle the electrolysis is confined to the actual hair papilla and there is no resultant scar, the surface of the skin being undisturbed by the current. Confining the electrolytic action to the deeper layer of the skin results in lessened pain also. A pair of forceps will be needed to remove the hairs as they are loosened, and this should have a soft spring for easy manipulation, the hair being lifted out rather than pulled. A magnifying glass is usually essential.

The patient should recline on a couch or tilting chair, and the dispersing pad is best laid in the patient's lap over a waterproof contact being made with the hand. This permits the current to be made and broken by lowering and raising the hand after the proper current is turned on at the controller, resulting in less painful makes and breaks than any metal switch.

The needle is passed down the follicle in the direction of the hair, avoiding piercing the walls of the follicle. With a sufficiently slender needle the bottom of the follicle is readily felt, when the current is turned on without shock until about 1 milliampere is reached. The hair root may be loosened in about twenty seconds with this current. If the forceps shows it to be still tight the current should be continued until it is loosened. The needle should not be removed unless the patient's hand is off the pad, and it should remain off until reinsertion.

The considerable pain of this little operation may be lessened by permitting a drop of cocaine solution to flow into a hair sheath after removal of the hair, this occurring easiest if it be placed in contact with the needle before it is removed. Cocaine thus mechanically inserted into the little wounds will render nearby hairs less painful under the application, and permit an increase of current strength, but it should not induce the operator to remove hairs in close juxtaposition at the same sitting as irritation and consequent blemish may result.

Such a sitting is usually continued for thirty minutes, and should not be repeated at the same site until all soreness has disappeared. A wash of witchhazel or alcoholic mixture should be applied for several hours after the treatment.

Positive Pole Coagulation.—This application is designed to obliterate a tumerous enlargement of a bloodvessel by the production of an *absorbable coagulum* and sufficient irritation for its consolidation and subsequent absorption. It is employed in the treatment of *cavernous angioma* and *hemorrhoids*, and requires that a platinum or nearly pure gold electrode be employed. For the technic of wiring and positive pole coagulation of aneurisms see Chapter X, Practical Electrotherapeutics and Diathermy (Massey.)

An absorbable coagulum in a blood tumor is desirable in avoiding suppuration or a slough, the avoidance of an open wound being further secured by the puncture being "buried," i.e. the electrolysis being confined to the interior of the tumor by carrying the insulated part into the cavity, thus protecting the external opening from the action and permitting its prompt closing. The needle is best inserted as a bistoury in tenotomy, but in a hemorrhoid directly into the tumor.

Sufficient current, of sufficient duration, should be used until the sac is hard to the touch, the strengths and durations varying according to its size. A large angioma may require as much as 40 to 50 milliamperes for fifteen minutes or longer, while a

hemorrhoid hardens in fifteen minutes with 10 to 15 milliamperes. General anesthesia, preferably with chloroform, is essential in the treatment of an angioma in a child, while a surface swabbing of some flakes of cocaine will suffice for a hemorrhoid.

D'Arsonval coagulation is largely used for hemorrhoids, but it is believed that the positive pole application has a less painful technic and is less likely to produce an open wound.

Negative Pole Depigmentation.—Freckles, pigmented moles, accidental or intentional implantations of pigment such as tattoo marks, and even powder marks in the skin, may all be successfully removed by the negative needle, the current precipitating metal pigments against the needle in alkaline froth, including the pigment base of the pigmented mole.

These applications are painful, due to the natural pain of this pole and also the considerable time and current needed to loosen the pigment. Freckles require the least current and tattoo and powder marks the most of both current and patience. The smallest sized half-curved steel surgical needle is most convenient as the point may be inserted parallel with the skin surface. It is held in a handle of light weight without current breaking mechanism, the current being turned on after insertion of the needle.

We have employed this method for the removal of a brown discoloration a square inch in size on the cheek of an eleven months old baby. The baby was anesthetized with chloroform and laid on a large, warm kaolin pad connected with the positive pole, and the active pole was the smallest size half-curved surgical needle held in a handle. This was inserted parallel with the surface immediately beneath the cuticle. When a current of about 15 milliamperes was turned on a brown froth appeared at its sides, and it was possible with this current strength concentrated on an eighth of an inch length of this fine needle to actually move it sidewise beneath the cuticle, entirely removing the color, which when wiped away by an assistant, discolored

four ounces of water. A part of the work had to be repeated some months later with a final white scar, as it was found necessary to destroy the upper layer of the pigment-producing cells also.

Negative Pole Destruction of Skin Varicosities.—In capillary varicosities of the skin of the nose the negative pole, with a very fine needle, will cause instant disappearance of each enlarged capillary vessel a few moments after the needle is inserted into it and a fraction of a milliampere turned on. The final result is excellent. The positive pole, though less painful, is more likely to cause a temporary blemish.

Port Wine Mark.—A congenital diffuse angioma of the skin is treated in the same manner, but with a multiple needle electrode that has an adjustable insulating collar to limit the perpendicular penetration of the needles, and of course much more current is used. A white scar will result from each needle action, the intervening tissue being treated at subsequent application, but these should not be made until all irritation from the previous application has disappeared. The treatment of a large "mother's marks" is therefore a prolonged one.

CHAPTER XV

GALVANIC CURRENT IN OPHTHALMOLOGY

Negative Pole Stimulation and Basal Ion Extraction—Extraction of Basal Ions in Retinitis Pigmentosa and Incipient Cataract—Sclerolysis with the Negative Pole—Iodine Diffusion with the Negative Pole—Negative Pole Electrolysis of Benign Growths—The Galvanic Current in the Nasopharynx—Drug Diffusion within the Nasal Cavity—Destruction of Benign Growths by Positive Zinc Puncture—

Negative Pole Stimulation and Basal Ion Extraction.—Medical applications of waveless galvanism are made with moist electrodes within glass cups, that fit the contour of the surface of the eye with the lids closed. The current, always a weak one of 1 to 5 milliamperes, traverses the orbital contents after passing through and between the lids. As chemical action alone is desired the current in all these applications is as waveless as possible and turned on and off without shocks.

It is evident that such an application has absolutely different effects with the two poles, the negative pole effect being usually described as stimulating the circulation and the positive as sedative. But our present understanding of polar action indicates greater possibilities for straight galvanism in eye affections.

Extraction of Basal Ions in Retinitis Pigmentosa and Incipient Cataract. It is indisputable that a negative application to the orbital contents with moist cotton in an eyecup electrode will *extract bases from the molecules of nearby tissues, precipitating them on the metal plate at the bottom of the cup*, the extraction being in direct proportion to the milliamperage and its duration. *Retinitis pigmentosa* has been reported as favorably affected by negative galvanism, doubtless due to the extraction of the bases of the deposited pigment.

Sclerolysis with the Negative Pole.—This procedure, described below, has a direct application in *corneal opacities*, good results being reported by Leduc, Alleman, Harris and others. It is applied to the cornea with a cotton swab wire electrode, the cotton being saturated with normal salt solution and applied directly to the opacity, with a current of 1 or 2 milliamperes for two to five minutes, after cocainization of the conjunctiva. The lids are kept retracted with the fingers of the left hand and the electrode is not allowed to come into contact with their edges, as these are much more sensitive than the conjunctive. The best results were in cases reported as in their early stages.

Iodine Diffusion with the Negative Pole has been employed in *ulcers of the cornea*, with a similar technic, a 1 per cent, potassium iodide solution being employed and a current of ½ to 2 milliamperes.

Negative Pole Electrolysis of Benign Growths.—*Pterygium* and *tarsal cysts* are readily destroyed by the negative needle with less tendency to the production of a slough than the positive needle or desiccation. The pterygium may require 2 milliamperes for some minutes, the fine needle being gradually moved from its apex to the base of the growth without breaking contact. It is inserted into the growth itself, parallel with the sclera. The cyst may be permanently destroyed with about 1 milliampere for a minute.

Hemorrhagic Retinitis, Incipient Optic Nerve Atrophy.—are often quckly relieved and the degenerative process retarded by the application of mild negative galvanism (1 to 3 milliamperes) frequently. The author has often seen a partial restoration of sight which continued for years where cases have seemed hopeless. **Iritis.**

The pains of Iritis as well as other congestive affections of the orbit are usually quickly relieved by the application of positive galvanism.

Conjunctivitis.—The catarrhal, and the granular form of this affection respond to zinc sulphate solution applied on a cotton covered small tipped electrode, made of platinum, gold or zinc, or a pure zinc tip properly shaped. The positive must be the active pole used. The negative surface electrode may be placed under the hand, so the patient can control the toleration of the current by more or less pressure on the electrode.

CHAPTER XVI

THE GALVANIC CURRENT IN THE NASOPHARYNX ORAL CAVITY AND EAR

Drug Diffusion within the Nasal Cavity—Destruction of Benign Growths by Positive Zinc Puncture—Granular Pharyngitis—Hypertrophy of the Turbinates—Otitis Media.

Drug Diffusion within the Nasal Cavity.—This therapeutic procedure needs further study of the older literature, as interpreted by our present knowledge of polar action and drug diffusion. Straight waveless galvanism or drug diffusion may be applied to the mucous membrane on slender, cotton covered wire loop electrodes or shepherd crook electrodes, the loop or crook preventing loss of the cotton in the cavity and imparting the qualities of a blunt, flat electrode when covered. These applications are well borne after mild cocaine swabbing. Mouth applications can be made without cocaine.

Galvanic medicinal applications to the throat, on the contrary, are badly borne owing to their stimulation of the reflexes.

Destruction of Benign Growths by Positive Zinc Puncture—This procedure, is particularly valuable in both hemorrhagic and non-hemorrhagic growths within the nasal cavities, as any desired amount of power can be applied directly into the

growth from slender electrodes that are curved by the surgeon to conform to the cavity, the electrode being thinly covered with insulation and capable of exact placement. A single application of a strength proportional to the area of the growth will often arrest the hemorrhage, and when repeated at intervals of two days to a week will cause complete disappearance of the growth in a few weeks, without a bloody operation and without subsequent recurrence of the growth if the base has been completely destroyed.

In *Granular Pharyngitis* the application of zinc with properly shaped electrodes by the metallic electrolysis method is very efficient; likewise a similar procedure in cases of *Hypertrophy of the Turbinates*, or in the latter case a 2 per cent. solution of zinc sulphate using a platinum, gold or zinc tipped applicator electrode covered with absorbent cotton, of course. The positive pole will be the active one. The amount of current used will be to the point of easy toleration, usually one to three or three to five minutes. If the local application of cocaine or butyn be made any possible burning sensation can be obviated.

In *Otitis Media* a two per cent. solution of zinc application is almost a specific. The author has repeatedly observed the disappearance of the purulent discharge after a few treatments. But electrolysis of urethral stricture, if properly carried out by having respect for the delicate tissue involved combined with careful technic, can be made a successful and satisfactory procedure.

CHAPTER XVII

GALVANISM IN GYNECOLOGY

Aseptic and Other Precautions—Wave Stimulation of Muscle and Neuron—Positive Pole Applications to Vaginal Cervix—Insertion of Intrauterine Electrodes—Negative Pole Intrauterine Applications—Positive Pole Intrauterine Applications—Positive Pole Surgical Ionization of External Growths—Uterine Fibroids—Uterine Displacements—Endocervicitis and Erosion of the Cervix.

Aseptic and other Precautions.—The first precaution is proper cleanliness of the hands and instruments, for though the extreme asepsis of cutting operations is not needed, the hands and instruments should be clean and germ free.

The second precaution is that the office practitioner without special training in gynecology should secure a confirmation of his diagnosis in the more serious cases whenever possible, so far as a diagnosis can be made by vision or the bimanual touch. Many minor conditions of relative distress can fortunately be relieved without absolute local diagnosis by vagino-abdominal wave currents, for many patients have been referred to surgeons for uterine trouble, and some operated on, for sigmoidal stasis without the presence of uterine disease. *But no intrauterine applications should be made unless the presence of tubal inflammatory trouble, a latent pelvic peritonitis, or pregnancy, have been excluded.*

Wave Stimulation of Muscle and Neuron.—This is a most valuable resource to the office practitioner with a feminine clientele. Alternating surges, under thirty per minute, are usually indicated. With a sufficiently large moist surface electrode on the abdomen and a cylindrical vaginal electrode, (Fig. 18) passed back of the cervix, a half-hour treatment given tri-weekly will tone up the muscles of married women, stimulate the pelvic

circulation, including that of the ovary, and at the same time help to overcome the sigmoidal stasis so common with them. No routine procedure could be more valuable, with or without some preceding diathermy.

Figure 18

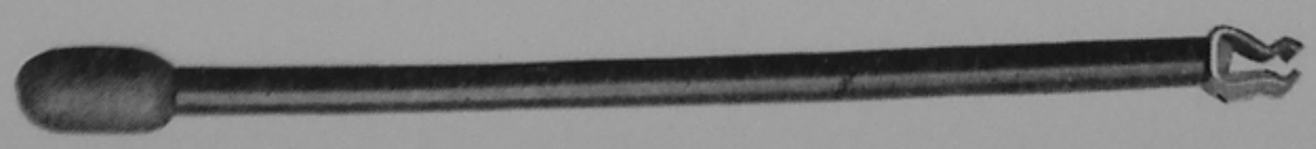


Vaginal Electrode for Alternating Current

Various relaxations, displacements and other mechanical faults should not be corrected by taking a tuck in the relaxed part until a more scientific method has been tried. One would not take a tuck in a suspender that had lost its elasticity if its relaxed rubber web could have this quality restored; and this is what can be done at times by wave current therapy in the relaxed muscles of women who are not aged.

Nickel-plated electrodes are suitable for alternating current only. A carbon ball electrode, (Fig. 19), which should be covered with cotton and moistened, is necessary when galvanic sinusoidal waves are used. The wet cotton may be lightly soaped for easy insertion when a speculum is not used. We use a carbon ball vaginal electrode, (Figs. 20-21-22) for galvanic waves frequently.

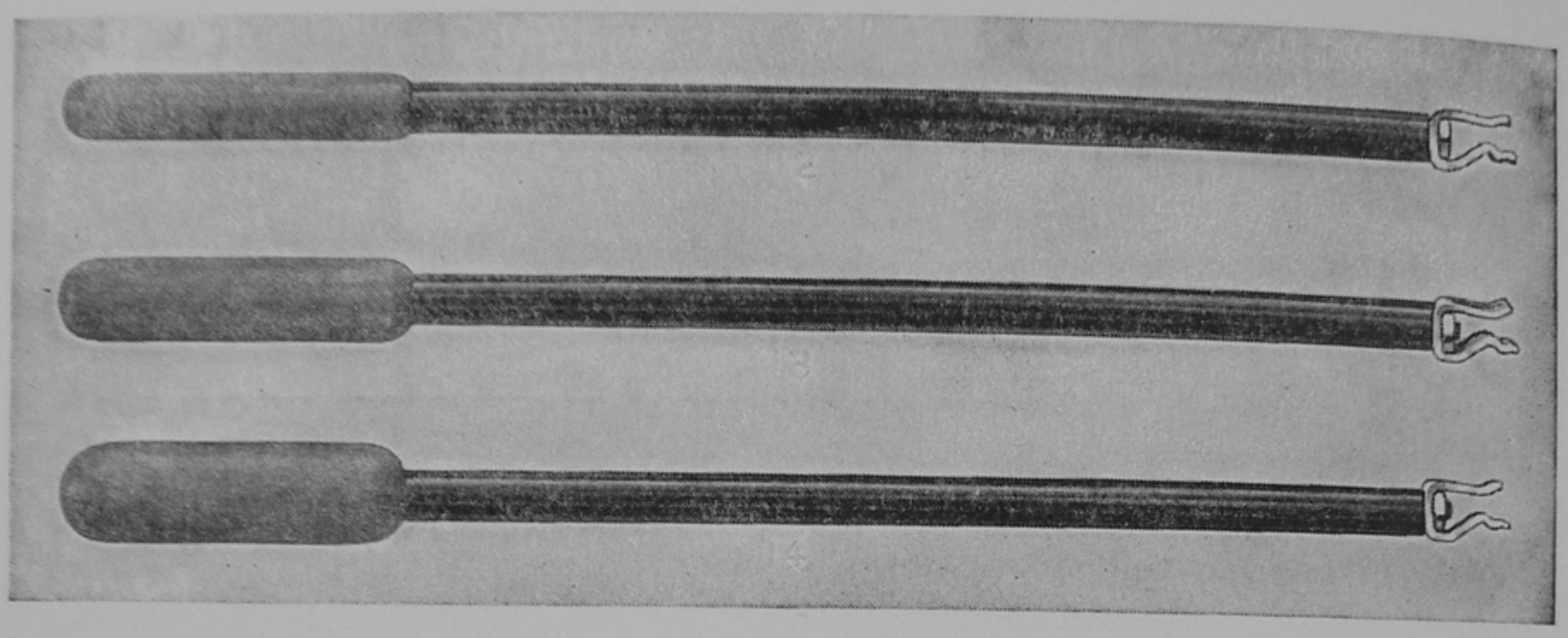
Figure 19



Carbon Tip Galvanic Electrode.

The design usually employed

Figures 20, 21 and 22.



Other forms of Carbon Electrodes used for Rectal or Vaginal work.

Positive Pole Applications to Vaginal Cervix are indicated in erosions of the cervix. An active electrode of copper or zinc, (Fig. 23), with all surfaces insulated except that in contact with the erosion is most convenient. These cases generally require intrauterine treatment to reach the source of the irritating discharge.

Figure 23

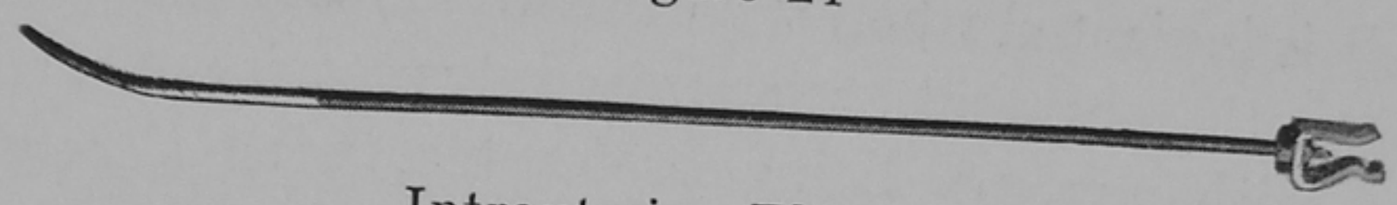


Copper Tip Electrode

Insertion of Intrauterine Electrodes.—We have used the method of Apostoli in insertion of intrauterine electrodes or sounds for years, with a minimum of discomfort to the patient and avoidance of tenaculum wounds in the cervix. This method is superior to that requiring a speculum and tenaculum for the reason also that the educated touch within the vagina during the insertion, coupled with that of the external hand on the abdomen, give a better knowledge to the physician of the position of the body of the uterus and the direction of the axis of the

uterine cavity—a knowledge that is often lost by the distortion of the speculum, even after the position had been ascertained by a previous examination. The technic, which permits of conforming the electrode to the cavity rather than the cavity to the electrode, is as follows, (Fig. 24):

Figure 24



Intrauterine Electrodes

Negative Pole Intrauterine Applications.—These applications are made for *atersia of the uterine canal*, 5 to 10 milliamperes for five minutes, *infantile uterus*, the same strength; *subinvolution*, 20 to 25 milliamperes for five minutes, followed by fifteen minutes of alternating current surges with the same electrodes; *prolapse*, the same as for subinvolution.

Intrauterine applications should not be made when inflammatory conditions exist in the appendages, nor should they be repeated oftener than every five to seven days, except, in the case of the positive pole, they may be made oftener for the urgent control of hemorrhage in a bleeding fibroid.

It should be unnecessary to state that the electrode is first sterilized. Ascertain the curve of the cavity by a preliminary bimanual examination and select an electrode to fit the curve. With the left finger locating the os, lift the cervix slightly by the finger under its posterior lip and pass the tip of the electrode along the palmar surface of this (left) forefinger until it engages. the os, when the handle is gently depressed curving the tip forward in the line of the cavity, in which it usually glides easily, though ther is sometimes difficulty in passing the internal os. If this is not surmountable by patient effort *without force*, remove the instrument and try a larger one, as the tip may have been caught on a fold of the mucosa, or, finally, a smaller one. The instrument should be supported at its handle during treatment.

Such a method has the apparent disadvantage of soiling the instrument with the vaginal discharge, but over forty years experience shows this to be illusory.

POSITIVE POLE INTRAUTERINE APPLICATIONS.—This pole is indicated when the discharge from the uterine canal is persistently purulent, a copper intrauterine electrode amalgamated with mercury being preferable, with a current of 10 to 15 milliamperes for ten minutes, according to the case. In *metrorrhagia* from any cause, (save hanging polyps, which should be twisted off with forceps) the positive pole may be relied on to control hemorrhage almost at once, with currents from 10 to 20 milliamperes, the latter strength only with a large tipped instrument in the capacious cavity of a bleeding fibroid. With the larger dosage the largest instrument capable of insertion without dilation should be used, and at times the duration should be applied to more than one section of the cavity at the application, with a total duration of not longer than fifteen minutes.

Positive Pole Surgical Ionization of External Growths.—An example of the use of this method in gynecology is the destruction of *caruncle of the urethra*, in which its use is somewhat less painful than desiccation.

As these growths are extremely painful and often extend an inch or more up one side of the urethra, the method of local anesthesia is important, insertion of the hypodermic needle being unbearable. This may be avoided by placing cocaine flakes on the caruncle ten minutes before insertion of the hypodermic needle, and adding more flakes during the ionization, the cocaine being dissolved by the moisture of the part.

With a large dispersing electrode on a distant skin surface and connected with the negative pole, three fine zinc needles are cut from thin zinc plate, each about two inches long, filed to a sharp point, and connected to the positive pole with fine wires-

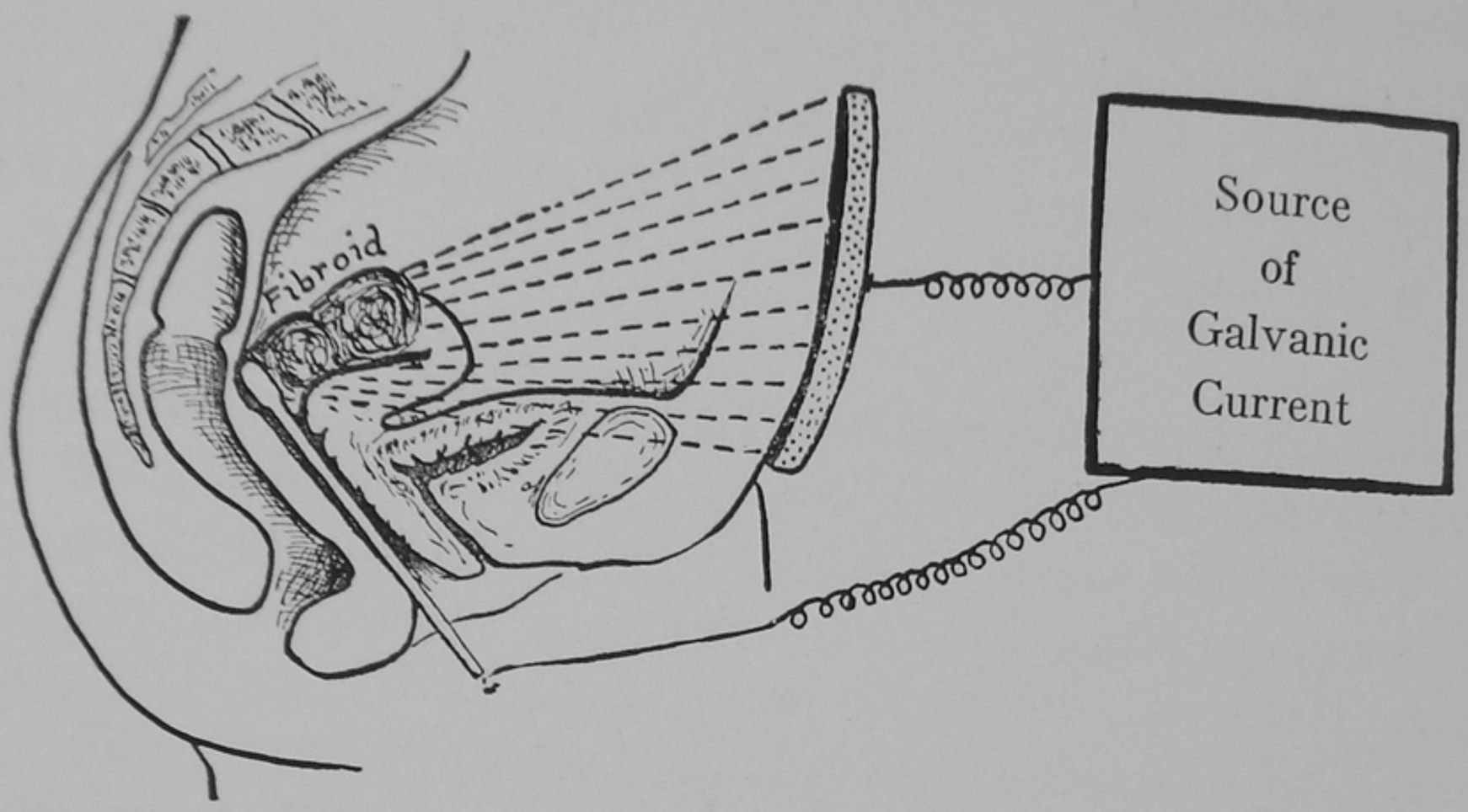
These are passed into the growth and a current of 3 to 5 milliamperes turned on without shock. As the ionization proceeds more current is turned on, until finally the whole growth turns white. An ointment dressing is used during the separation of the small slough.

Uterine Fibroids.—Ever since the famous gynaecologist, Dr. Georges Apostoli of Paris, appeared before the British Medical Association in 1887 in defense of the treatment of fibroids and other non-purulent and non-cystic conditions of uterine adenexa there has been much controversy on the subject. The subperitoneal and submucus variety, also the rapidly growing forms and those that have attained a size to cause sufficient pressure on adjacent viscera are recognized as being strictly surgical. All of the above varieties and conditions would probably fail to respond to galvanic treatment but more likely harm would follow the procedure, perhaps not so much by application but because valuable time would be wasted while something radical should be done.

However, there is a large proportion of cases of the interstitial variety when the only disturbance is either bladder or rectal pressure, or both, that are amenable to quick relief by positive galvanism applied in the vagina.

The technic consists of having a large, moist, abdominal, well saturated electrode made of a material that will diminish skin resistance to the greatest degree and a carbon ball vaginal electrode well covered with absorbent cotton or gauze and so placed in contact that the current will pass through its greatest diameter using twenty to thirty milliamperes for fifteen to twenty minutes. A longer seance might cause pain due to the contractile action of the current. A copper tipped vaginal electrode should not be used as it is not the local effect we desire but the interpolar. See Fig. 25.

Figure 25



Assuming the case to be one favorable for this treatment, in a short time and sometimes after one application as outlined the patient expresses herself as having a relief of pressure and pain, if pain had been present.

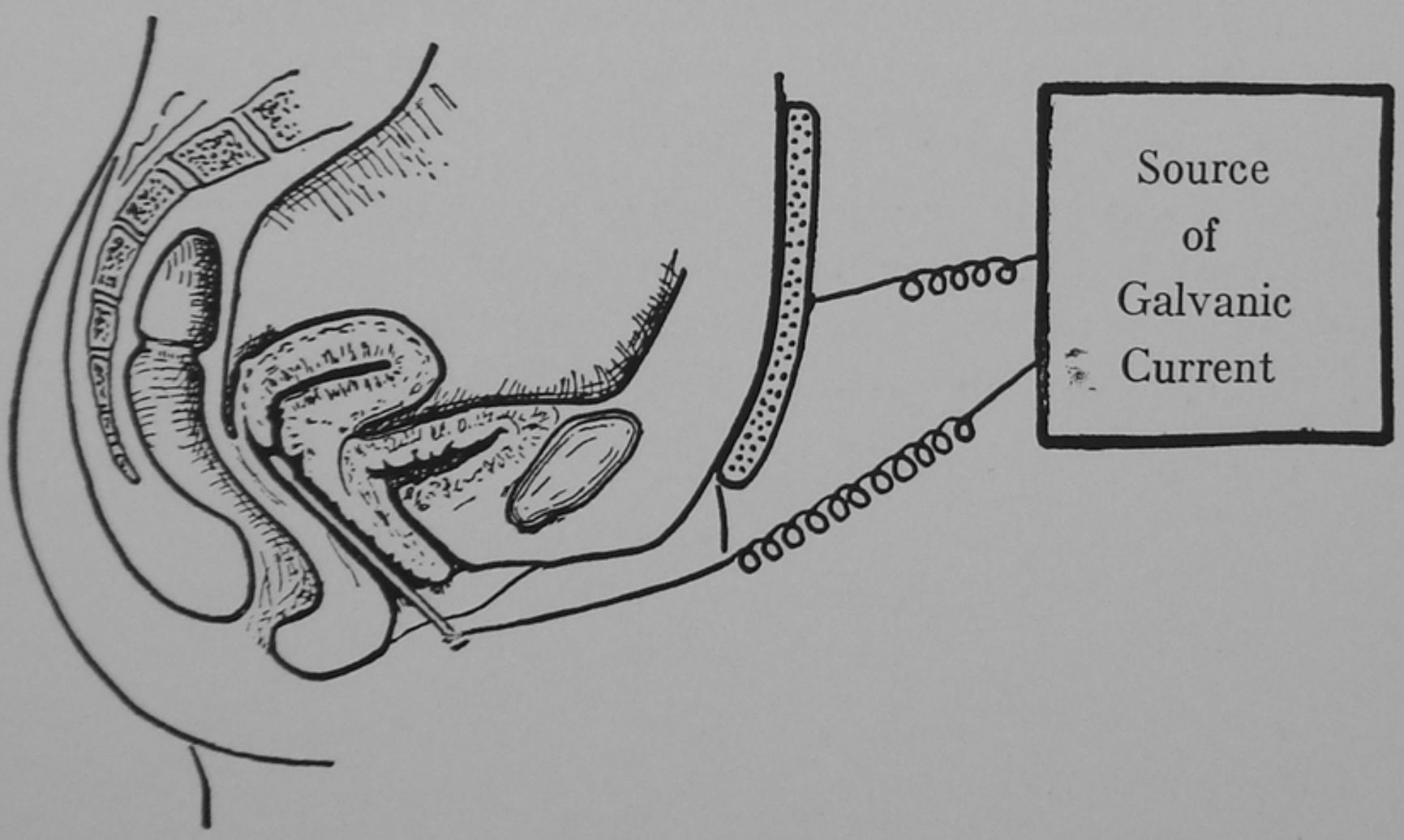
Two treatments should be given weekly at first, gradually extending time between seances as the case will allow. The fibroid will not disappear as with surgery when the patients sometimes will, but from one-third to one-half diminution is frequently noticed and she becomes symptomatically cured. What more can a reasonable woman want or expect with the alternative of facing a possible serious operation? The patient must be made to understand that total elimination is not to be expected lest someone antagonistic to the method injects his opinion and causes her to relinquish further treatment.

Uterine Displacements.—The positive pole with carbon tipped electrode is the method usually required where the condition is one where relaxation of the uterine supports of the vaginal wall is the impairment to be restored. It is the local astringent tonic effect, combined with the inter-polar action that produces the result. See Fig. 26.

If however, there are local vaginal adhesions where direct application can be made the carbon tipped electrode (covered) should be used with the negative pole where local ionization would be indicated. A thorough knowledge of the local action of the pole must be the guide to the requirements of the procedure.

Endocervitis and Erosion of the Cervix.—What has been said on surgical ionization will apply to this class of cases, but one must ever keep in mind that curettment and essential surgery must often go hand in hand in this part of the human anatomy.

Figure 26



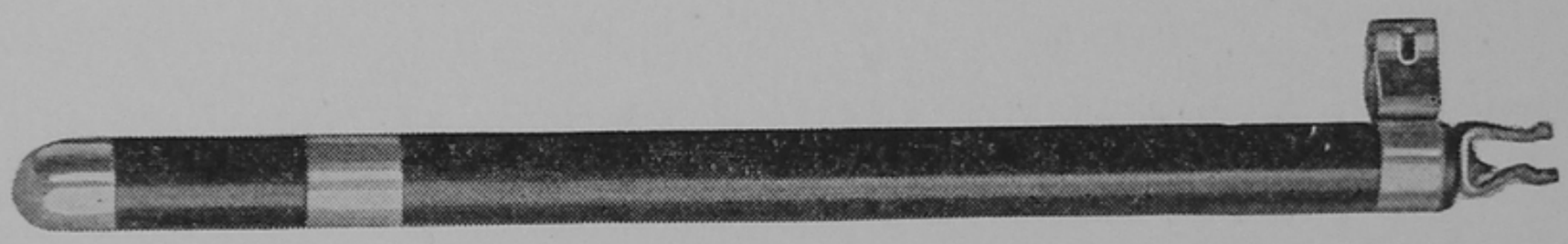
Vaginal as well a Rectal copper tip electrodes are used with the positive pole for local astrigent effect only. See Fig. 23.

Care must be used in the application of copper or any soluble metal because of tendency to adhere to the mucus surface and if forcibly extracted may cause a denuding of the membrane. When it is removed this is easily obviated by turning off the current and changing to Negative pole for Internal electrode for about two minutes which will release it, use but little current in

this procedure as a reversal of the Galvanic current will often cause a painful contraction. The surface electrode for Vaginal application may be on abdomen or back or with a bifucated cord or both all dependent upon the part of the Vagina when special treatment is desired.

In relax vaginal conditions a bipolar electrode to be used with the Faradic or rapidly alternating Sinusoidal Current. Never with the Galvanic Current. See Fig. 27.

Figure 27



Bi-polar Vaginal Electrode

Fig. 27 Shows bi-polar vaginal electrode, where the vaginal walls have become relaxed and local conditions as might be indicated, for the use of alternating or faradic current only.

CHAPTER XVIII

THE GALVANIC CURRENT IN UROLOGY AND PROCTOLOGY

Positive Pole Sterilization and Stimulation of Ulcers—Positive Pole Coagulation of Hermorrhoids.

Positive Pole Sterilization and Stimulation of Ulcers.—This has been employed successfully in *fissure in ano*. A blunt zinc-mercury electrode is pressed against the fissure, previously cocainized, and a current of 2 or 3 milliamperes applied for five minutes, followed by an ointment dressing. The treatment should be repeated in three weeks if the painful condition persists.

Positive Pole Coagulation of Hemorrhoids.—The technic of this procedure is similar to that in cavernous angioma, except that the puncture is made into the hemorrhoid direct and that but 7 to 10 milliamperes are used. A platinum-iridium needle is employed, insulated with hard rubber or fused sealing wax up to one-eighth inch of its point. This is inserted, after cocaine ionization, with the insulation carried into the cavity of the hemorrhoid, thus making a buried puncture. The electrode may be placed through the speculum, the latter being then withdrawn while the electrode is held in position; and when a strip of hard rubber is passed up the rectum behind the spot under treatment to protect the opposite rectal wall, the latter may be carried out with all instruments withdrawn except the electrode and rubber strip without stray current effects. The current strength mentioned will cause coagulation of the hemorrhoid in fifteen to twenty minutes, which will be organized and absorbed without a slough being formed.

PART II

LOW VOLTAGE ALTERNATING CURRENT

CHAPTER I

TECHNIQUE—LOW VOLTAGE

Alternating Current—Sine Wave Currents—Rhythm—
Technique of Treatments.

The alternating current is one which periodically flows in opposite directions, and in each direction for the same length of time, and whose variations in strength when flowing in either direction take place in the same manner and are equal in amount.

When the current has passed from zero to a maximum value in the one direction, and through zero to an equal distance in opposite direction and returns to zero, it is said to have completed a cycle. Fig. 3. The number of cycles gone through in one second is termed the "frequency of the current."

The alternating current has been efficient in therapeutics chiefly because of its indispensable use in the production of X-ray and high frequency currents. The localization of heat all the way from fine desiccation to extensive diathermy procedure, is in a class by itself. The localization of heat enters into relief and curative action of such a vast number of painful symptoms and diseased conditions that indications for its use are almost limitless.

But there are other uses of alternating currents, when the waves are of low voltage, low frequency and sine shape, that are considered in this work, by which full physiologic stimulation of internal hollow organs as well as external muscular fibre may be produced. It is by this means that intestinal stasis and functionally impaired muscular areas of various parts of the body, can be definitely acted upon without the production of heat or chemical action.

The combination of heat and deep molecular massage often is of greater benefit in the majority of chronic cases than either one alone.

SINE WAVE CURRENTS

In 1883, Dr. Kellogg devised a mechanism consisting of coils and magnets which produced a current of a much smoother quality and apparently of more value in the treatment of impaired muscles than the Faradic current. In 1886, he presented a paper before the American Medical Association describing the apparatus and claiming distinct advantages over his earlier discovery, which was really an alternating form of current produced by magnetic induction.

In 1892, D'Arsonval of Paris produced an apparatus consisting of more coils and more magnets to which he gave the name "sinusoidal" current. It was later discovered that it was practically the same idea as that originated by Kellogg, only with the greater number of coils and magnets. The effect was the same, only the current seemed to have a smoother quality because of the greater number of impulses produced. Manufacturers of medical apparatus, realizing the importance of the newer method, reproduced mechanisms under different trade names, producing a sinusoidal current.

More recent products on the same principle have been devised, and at present the alternating sinusoidal current, and the direct sinusoidal current, have become standardized and better understood. The rapidly alternating sine wave current, by increasing the usual sixty cycles per second to one hundred and eighty cycles, produces a blended tetanic contraction with less painful effects.

The galvanic sinusoidal, on the other hand, is a reversal of the polarity and, when made to produce muscular contractions sufficiently slow to harmonize with physiological action, the resistance of the skin and consequent burning sensation prevents

toleration and renders it impractical. A uni-directional sine wave does not reverse its polarity, and is of practical value because the regularity and usefulness of the polar effect is not destroyed.

It is vastly important that the duration and frequency of the wave should be in keeping with physiological functions which can be easily determined, and the strength of current and length of time during application is also another essential, lest failure to simulate normal nutrition of the part causes undue stimulation, which might defeat the object to be accomplished. This applies perhaps more to the direct current, as the element of heat is there involved and must be considered as well. The alternating current, unless used with the proper recognition of the number of cycles per second harmonious with cellular activity, may also fail to accomplish results because of local irritation and resistance induced. It is unnecessary to state that the definiteness of the measured wave currents must appeal to any physician who desires to get away from the empiricism, which is a too common practice.

The wave current principle, from whatever source the origin may be, is being recognized as a wonderful help in physical therapeutics, and the prime object of sine current is to enhance the value of the different electric currents with which we have all been familiar; but unless normal muscle action of the part is recognized and respected and treatment applied accordingly, the results are likely to be disappointing. With the present literature on the subject, combined with the improved mechanism to carry out the theory, there should be no excuse in selecting the proper method to fit the case at hand.

An apparatus has recently been devised whereby the surging currents of wave generators can be so utilized with a diathermy apparatus that the combined action of the two can be used. This device is constructed so as to permit the application of the diathermy and the sinusoidal alternating current simultaneously. The advantage of this is that a collective wave current impulse can thus be utilized.

RHYTHM

There has been much empiricism in medicine in general, and likewise in our subject, physical therapeutics.

As physicians, we are interested only in what applies to the human body, in the maintenance of health and the prolongation of life.

When a physician is consulted, the patient usually has a pain or some prominent symptom that has stimulated him to call for help. It is safe to assume the patient has either the result of traumatism or infection. It is usually easy to determine the injury, but the source of infection may be near or remote from the affected area, and its discovery is the one determining factor to decide the course of procedure for relief or cure.

Following injury or infection, after the acute inflammation has subsided and necessary surgery has been done, along with other remedial measures, nature makes an attempt at repair, and if on account of age, low resistance, or other debilitating causes, she makes little or no progress, then it is the physician's place to take a hand, and attempt to assist restoration of function.

With a proper understanding of the physical and electrical methods now at hand, one has only to select the method that might apply. To combat infection and assist cell activity, we must use either heat, mechanical, or chemical action, or by a combination. Outside of local and constitutional effects of the various forms of light application and the Xray, it is the heat and mechanical action that in the majority of cases we must depend upon.

Any attempt at restoration of muscle and nerve function toward normal activity must be dealt with in reference to the physiological action of that part under treatment. Otherwise a discordant rhythm will be the result, and harm might ensue.

The above remarks bring us back to normal rhythm of the different tissues, and should make us willing to re-study our physiology when using physical therapeutics, as a better guide for obtaining good results in treatment than the literature that usually accompanies physician's apparatus to instruct him how to "cure" his patients. Too often this is his only source of information.

Whatever applies in nature to growth, maintenance, and perpetuity, necessarily applies to that vital principle we call cell activity, which is the essential element of prolonging human existence. Whatever similarity there may be in vegetation and human life, there is one principle that is recognized, and accepted; that there is a certain coordination of activity which is known as rhythm.

Anatomy is the knowledge of the structure of the human body, and is not changeable. Physiology is the sum of the activities of the various functions of the body, and is constantly changing, and that change, which we recognize as impairment of function, is a tendency toward disease, and we meet it in all stages; consequently, our knowledge of what we would do, if we could, must be guided by normal physiological semblance. Advanced age, constitutional disease, and diminished resistance from various causes, are always important considerations when therapeutic results are looked for.

If the body is to work efficiently and to develop its physical powers to their full extent, it is absolutely essential that the movements of the muscles on the one hand, and the activities of the circulatory and respiratory systems on the other hand, should be coordinated and integrated into an harmonious whole. Perfect coordination brings about the maximum of work, with the minimum of effort. Incomplete coordination, on the contrary, inevitably spells inefficiency.

An exaggerated response to stimulation on the part of the respiratory, circulatory, or muscular systems, either locally or as

a whole, involves a useless expenditure of energy. On the other hand, a deficient response likewise impairs the efficiency of the mechanism, and renders necessary function ineffectual or totally inert.

It is in keeping with this thought that wave current therapeutics to synchronize muscle action were evolved, and clinical experience has shown the usefulness of the procedure. The definiteness of the principle is shown by the accuracy with which it can be demonstrated, and it is generally adopted by those whose experience and knowledge have taught them the importance of recognizing and respecting normal physiological action.

To use the galvanic current intelligently one must understand the physics of this current, so one should have a knowledge of the underlying principles that keep the mechanism of the human body at the zenith of function if we wish to aid in this effort.

TECHNIQUE OF TREATMENT

As in drug therapeutics, any medicine sufficiently powerful to affect body tissue if used too strongly or too long is as likely to do harm as to be beneficial.

While each case should be treated according to special indication, there are some general rules that might apply if the work is going to be done in a definite manner.

Although the nervous system initiates and controls every movement of the body, the energy required for carrying out the physical work is developed in the muscles themselves, and their power to transform potential into kinetic energy, which appears as exercise or heat, and to renew their store of energy is the essential of muscular exercise.

Physicians naturally desire to produce quick results, and, if in their enthusiasm, a partially paralyzed muscle is exercised to

the point of fatigue, the effect is debilitating instead of invigorating, while a shorter and less vigorous application might have been effective. For instance, in many cases of constipation, where the subject has thin abdominal walls with poor expulsive power, the alternating surging sine wave is recognized because of its ability to penetrate deeply, with pleasing toleration. The patient and the doctor feel that invigoration of the part is needed, and the temptation to make the contractions powerful and sometimes prolonged often causes a feeling of profound weariness and frequently unnecessary local soreness.

If specific technique were printed, giving exact location of electrodes, frequency of treatment, and length of seances, any information thus obtained, regardless of any real knowledge of the reason why, is bound to be more or less superficial.

The busy physician too often turns the entire physical therapy over to his assistant, who may or may not have been properly instructed. The object of this book, therefore, has been to instil in the mind of the reader the principles involved, explaining the reason WHY, which if understood, would simplify HOW and permit intelligent application to diseased parts.

In other words, the successful operator with physical apparatus should determine definitely just what he hopes or expects to accomplish, along with the knowledge of the limitations of the method, being careful not to overstimulate, thereby exhausting and inhibiting what is expected to be accomplished. On the other hand, he should not allow timidity to prevent sufficient response to the method used to insure results.

The same principle applies to the treatment of locomotor ataxia, infantile paralysis, paralysis following cerebral hemorrhage or traumatism.

Surface electrodes, when used for the purpose of invigorating the lower bowel where the alternating current with surging effect is to be produced, should be of a size sufficiently large to so

lessen its skin sensations on the abdomen that the patient may feel the contraction beneath the electrode within the colon.

It is sometimes advisable to use two electrodes connected one in front and one back, which serves the purpose of one electrode but diminishes skin irritation and allows more current to be used.

Avoid giving any form of electrical treatment in the vagina or rectum without being absolutely sure that the outside portion is held firmly by some means, not only confining the treatment where it is intended, but to avoid accidents, as it is well known that where the skin and mucous membrane meet, there is an increase in susceptibility to all forms of electricity.

The author's internal electrode support, see Fig. 28, seems to answer this purpose of holding the internal electrode in place, as it is not only effectual, but any slight movement on the part of the patient will do no harm, or run the risk of breaking a glass electrode where high frequency is being used.

Forms of electrode supports fastened to the operating table or supported by a stand on the floor have been found impracticable.

Fig. 28

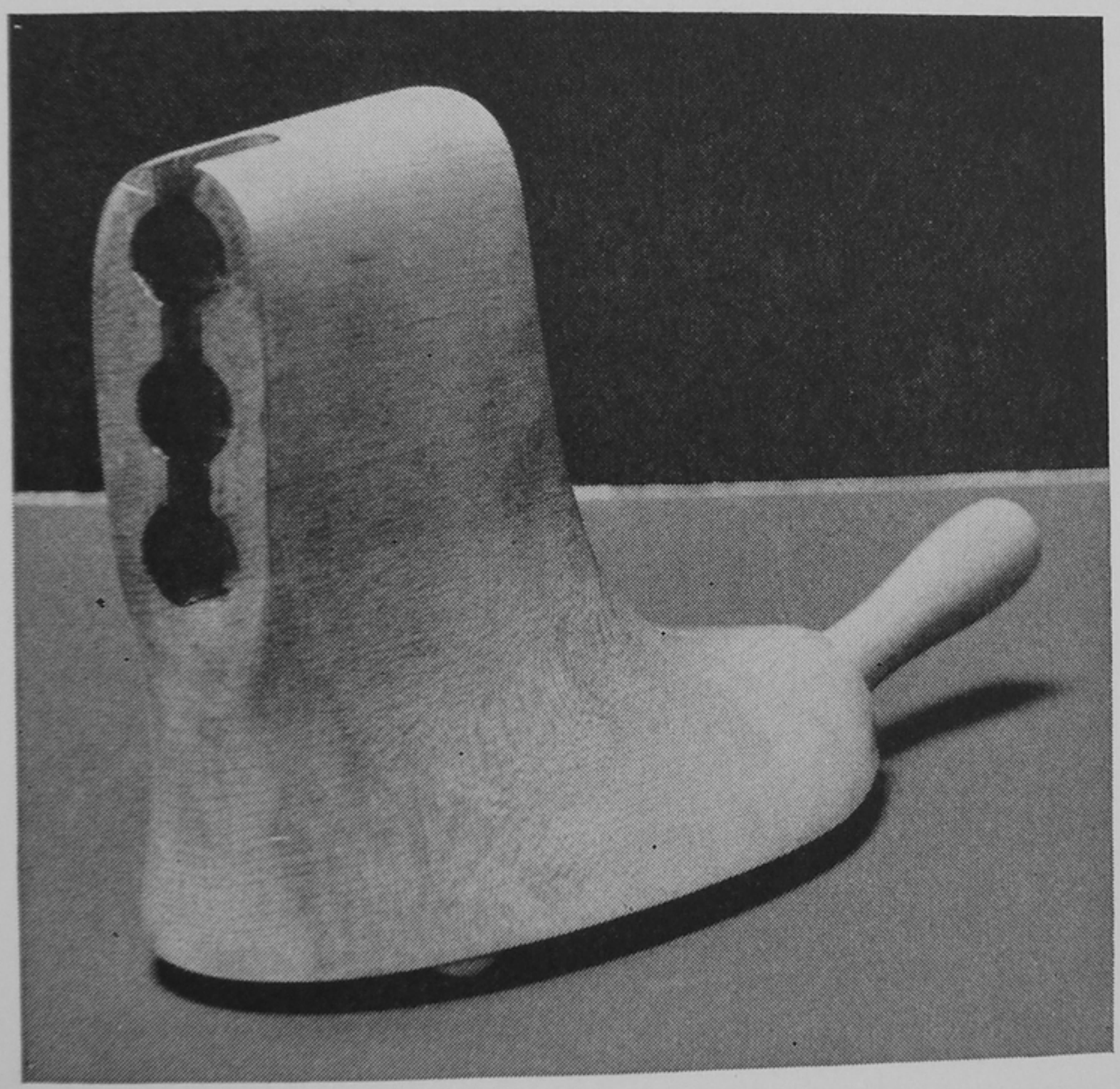
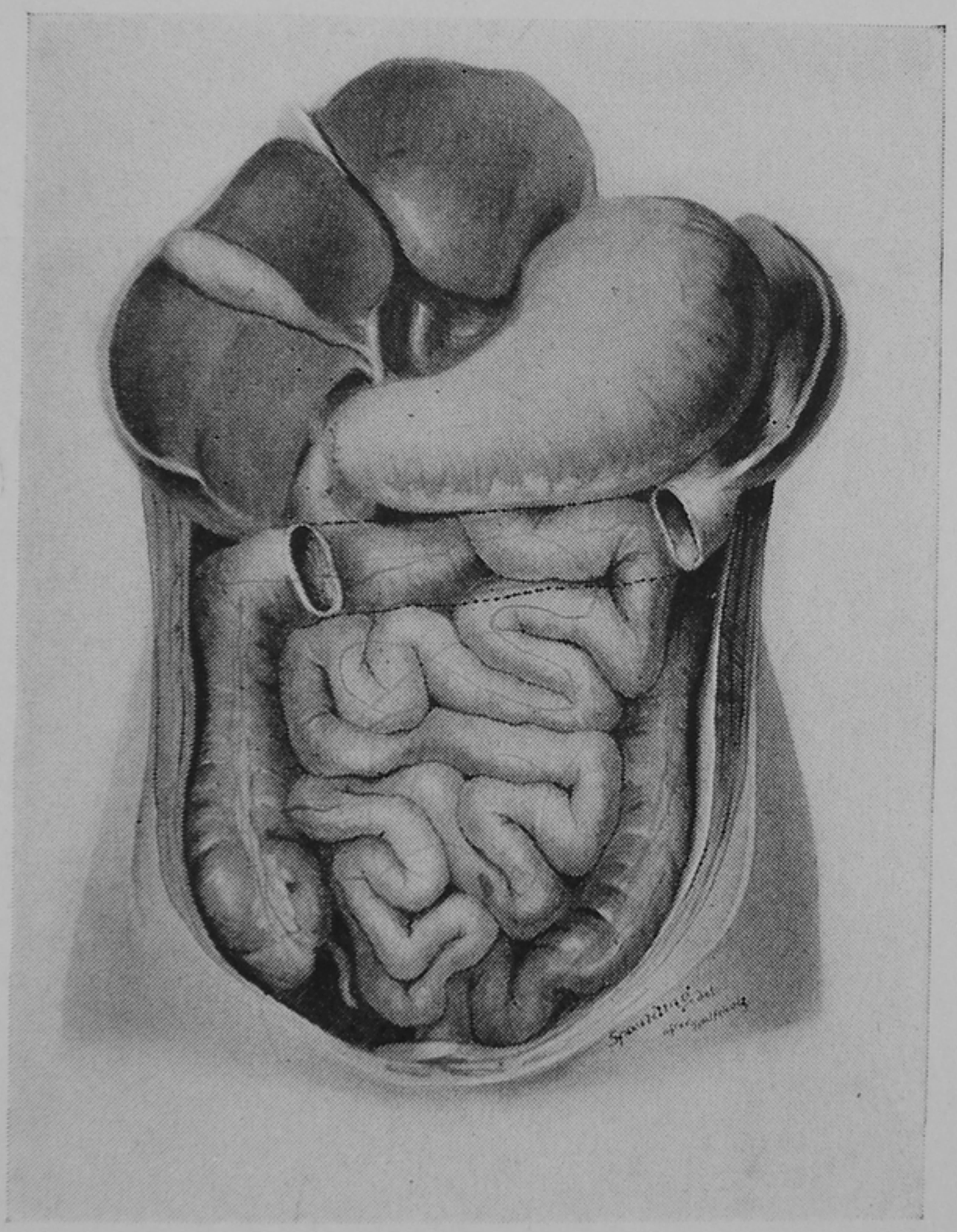


Fig. 29



This is brought to your attention so that it may refresh your memory on what anatomists consider the normal position of the Viscera, and as everything in the world is measured by comparision the visualization of Fig. 29 will help better to understand those which are to follow. The radiographs here illustrated are not drawn from the author's imagination, but from his own files.

Fig. 30.



Fig. 30 shows the Normal Viscera, with the liver and Gall Bladder retracted, exposing open sections of the Stomach, Duodenum, and Caecum, and incidentally gives a clearer conception of the position and function of the Ileocecal Valve; also calling attention to the fact that the calibre and structure of the colon are the same throughout, which is all-important in interpreting X-rays of the colon.

CHAPTER II

THE INTESTINAL INFECTIONS

Faulty Intestinal Elimination—Examination without X-ray—Obstipation—Caecum Infection—Colitis—Ilealstasis—Sigmoid Toxaemia—Gall Bladder Infection—Colonic Flushing and Intestinal Irrigation.

FAULTY INTESTINAL ELIMINATION

How few persons, even medical men, give a second thought to the process of intestinal mechanism as applied to the transmission of nourishment through the body!

It is a very simple matter to make an off-hand diagnosis that one has indigestion, autointoxication, a gall bladder infection, intestinal indigestion or the more common term applying to perhaps all of these, i.e., constipation.

Any of the above general symptoms should in no way be a guide for treatment of the condition, as the diagnosis is too often made on the patient's statement regarding his or her affected area.

The more mechanical a surgeon is, combined with his other necessary qualifications, the more successful will be his results, as unexpected conditions are constantly met with that do not appear on the surface, where ingenuity, and not book knowledge, becomes the most important element of success.

To illustrate: From the time one's food enters the mouth until it leaves the body, the passage of the nutriment through the thirty-five feet of digestive tract is practically beyond the control of the individual. Nature has endowed us with a passage protected by firm and soft elastic tissue, and in state of health all corners are rounded to diminish friction and prevent delay

beyond the normal time of exit. If, however, due to wrong living, which is a broad term and may apply to everything from a faulty and unbalanced diet to improper wearing apparel, the stomach becomes repeatedly over-distended and prolapsed, the colon, as a consequence, is caused to bend at the transverse portion. The hepatic and splenic flexures become angulated to such a degree that the normal transmission process, known as peristalsis, is interfered with, and a delay of bowel contents is the result. —Fig. 33.

Likewise, a similar condition of distortion, distention, and impaction may occur in the pelvic colon, generally spoken of as the sigmoid. The condition as outlined produces what is usually described as intestinal stasis. It is not enough as a guide for treatment to make a diagnosis of gastroptosis, enteroptosis, or intestinal atony. As one grows older, or has less resistance, regardless of age, degenerative changes more easily take place at the angles described, due to a combination of local infection and diminished blood supply.—Fig. 41.

X-ray examination of the digestive tract by bismuth or barium meal is absolutely essential to determine the condition of the stomach, duodenum, and ilium, as regards ulcer, malignancy, obstructions from other causes, and the rate of movement of bowel contents.

Occasionally a twenty-four hour series of exposures will show the shape of the colon. A barium enema with the properly prepared bowel, in the hands of a good operator, will usually reveal the truth of the condition of the colon, which in the author's opinion, is more essential. It is also certain to determine the condition of the ileocecal valve, which, if incompetent, would show the barium having passed through into the ilium. This could not be determined by an X-ray by mouth as it might leave a small amount of the barium which did not enter into the caecum.

The rate of the barium meal throughout the entire digestive canal is of interest, and it is not intended to convey the idea that one should not do a sufficient amount of X-ray work to enable him to get at the truth as to where the foci of infection exists.

As it is intended that this book shall be practical, we must take into consideration the fact that many patients are financially unable to pay for an extended examination. Often an X-ray of the colon alone, by enema, is sufficient to make a diagnosis.

A radiograph of the stomach, regardless of its malposition, would be of little value alone in the average case of intestinal stasis and constipation, because of the various distortions of which the colon is capable.

On the other hand, a well-defined radiograph of the colon by enema would give those familiar with the interpretation of radiographic work a very good conception of the position of the stomach, and any therapeutic application made for the distorted physiology found would apply to both organs.

SINE CURRENT

A very important consideration, and too often overlooked, is the fact that many forms of functional disturbance in the Pelvic region can easily be traced to Colonic Ptosis either Caecum or Sigmoid or both, by X-Ray enema. Such a procedure, before attempting any form of treatment, would present much persistent and useless tamponade and unsatisfactory Surgery.

Amenorrhea, Dysmenorrhea, Uterine Flexions and Versions, Simple Prolapsus due to relaxed Vagina and Vaginitis (non-specific) are examples in Gynaecology.

Rectal Fissure, Rectual Ulcer, Rectal Prolapse and Hemorrhoids, very often are made to disappear when the treatment as outlined in the chapter on Sigmoid has been properly carried out.

Recurrent Cystitis is another example of a local pressure caused by an over distended Sigmoid.

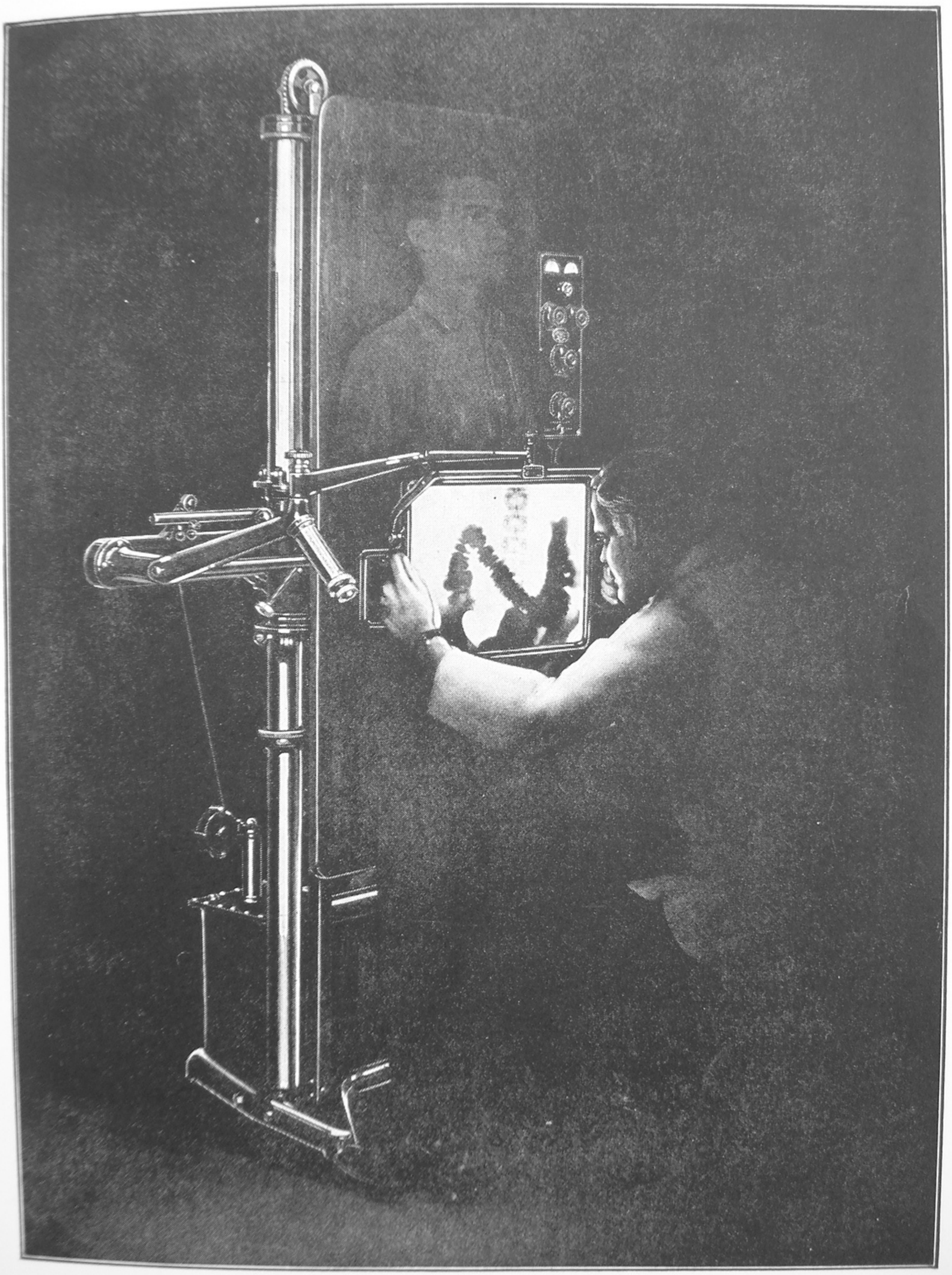
The above illustrations are to emphasize the value of a radiograph by enema, rather than the mouth, for a more certain diagnosis of the ietiology.

Fig. 31

A modern fluoroscope causing sufficient flexibility of adjustment to meet all requirements will give a good general visualization of intestinal topography.

To make it a success however, the stomach and colon should be properly prepared as one would for a radiograph.

The author's usual procedure is, when it is possible, to have the patient take sufficient castor oil at night followed by enema in morning and no breakfast until afterward.



COLON DIAGNOSIS WITHOUT X-RAY

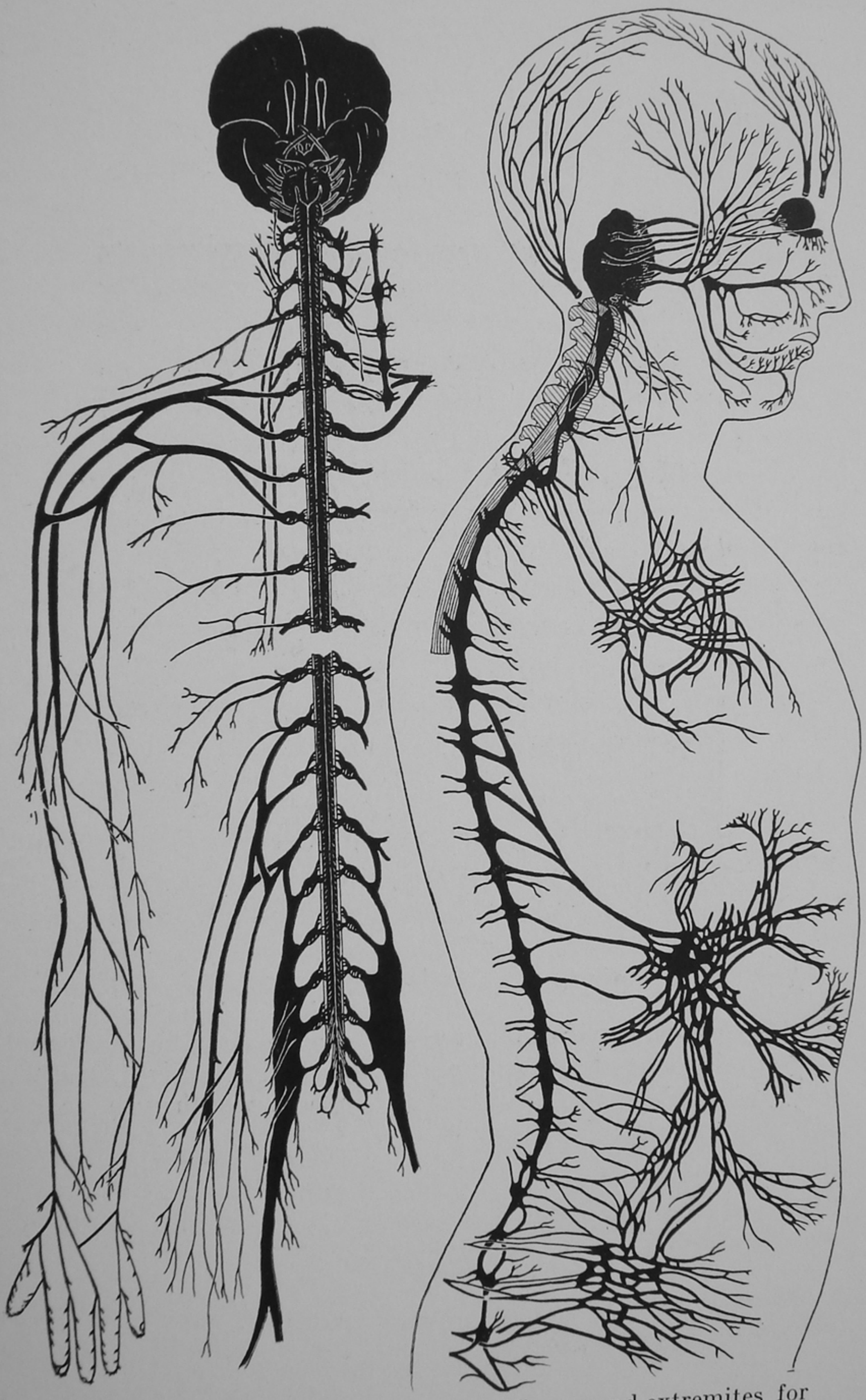
In the absence of a radiograph of the colon, there are certain diagnostic points which are of value and should not be overlooked, even if there is an X-ray verification. Given a patient lying on the back, clothes sufficiently removed to prevent mistakes, commence by percussion over the ascending colon. If it is a case of constipation of long standing, anticipating that the caecum will be distended, a more or less marked tympanitis will be recognized, which will vary in individuals as a rule, according to the degree of angulation at the hepatic flexure, or whether a thin or robust subject, and the chronicity of the constipation. The transverse colon by the percussion method will rarely elicit any information of consequence at the splenic flexure; however, there is usually a dullness in sharp contrast with the ascending colon. If the patient describes an imperfect and faulty bowel elimination, fullness, and if tenderness in the left iliac fossa is present, and assuming the above examination by means of palpation and percussion has been made, a probable diagnosis of visceroptosis would likely be correct.

To verify what seems to be intelligent guesswork, pressure on the region of the right twelfth dorsal nerve and on the eighth left dorsal nerve at its spinal exit, will usually reveal more or less tenderness, which is sometimes very acute, in sharp contrast to the nerve supply above or below the areas mentioned.

In a caecum infection which extends low in the pelvis, the lumbar nerves, which form the origin of the sciatic nerve, are sometimes involved in the infectious process and so-called "sciatica" is often present, which is easily traceable, not only from the condition found by percussion, but by a tenderness extending from the lumbar nerves on corresponding side directly over the course of the Sciatic nerve.

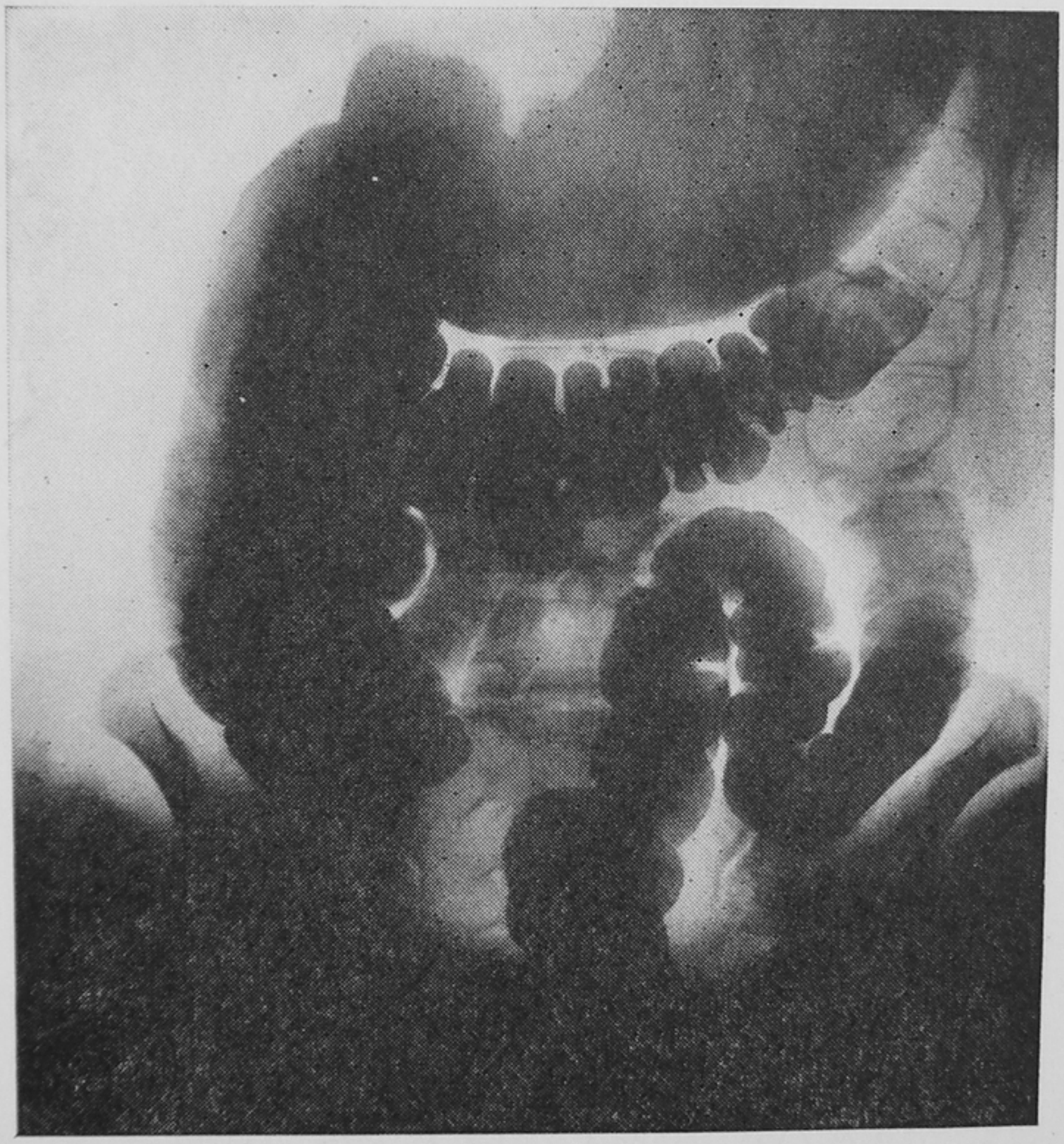
Therefore, the old term "sciatic rheumatism" is frequently infectious sciatic neuritis.

Fig. 32.



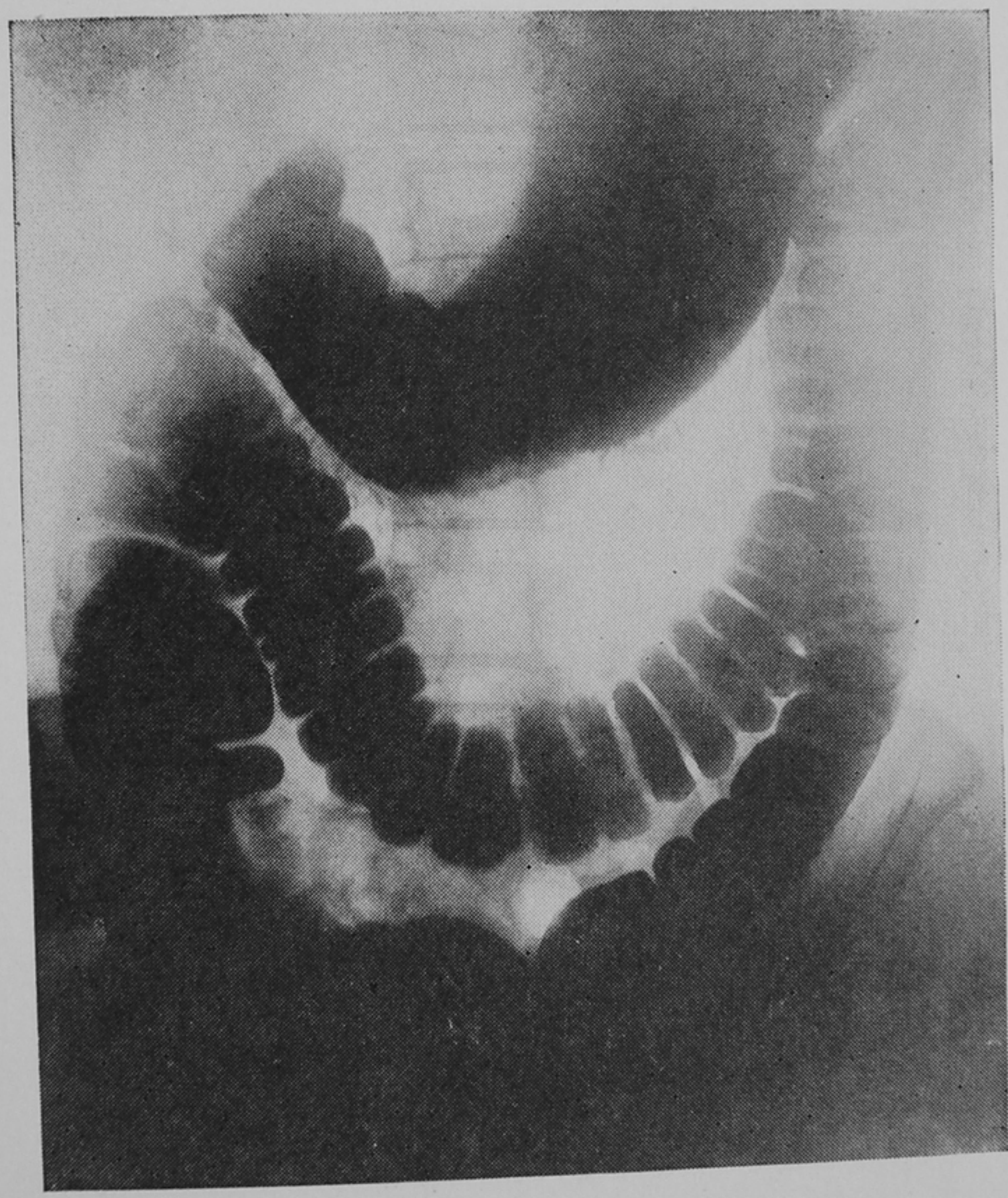
Outline of Nervous System supplying Viscera and extremites for a diagnostic help in Traumatism and Intestinal iniectfon.

Fig. 33.



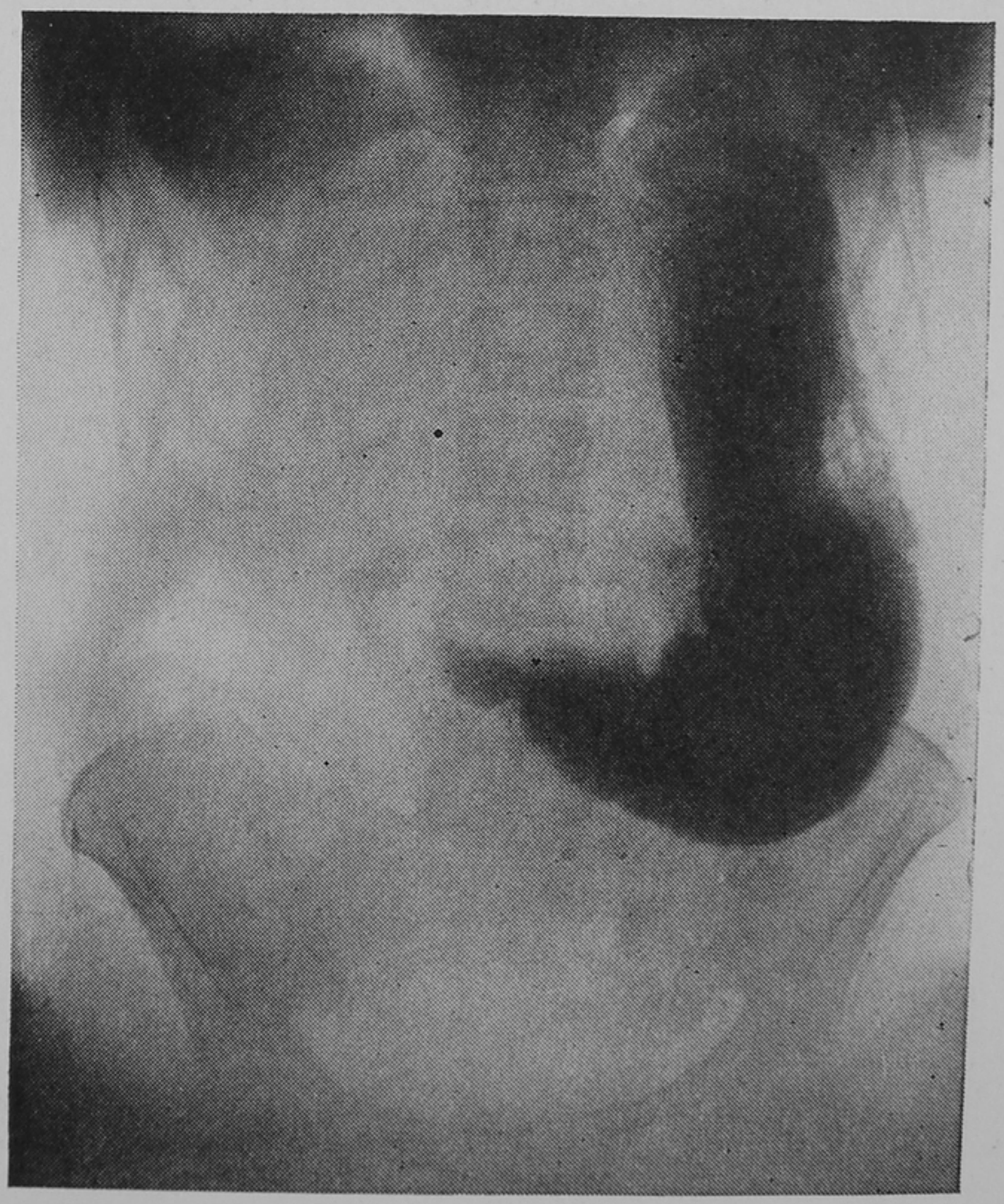
This is a Radiograph of a moderately prolapsed Stomach and Colon with sufficient peristalsis to maintain fair elimination. It might be considered a typical Gastro-enteroptosis, which if recognized early and proper treatment administered, much time and trouble would be saved as compared with the same condition a few months or years later.

Fig. 34.



Shows the position of a prolapsed stomach in the Median Line direction, which would likely cause about equal disturbance at the Hepatic and Splenic Flexure; but not sufficiently advanced to affect the Pelvic Colon.

Fig. 35.



The X-ray of a Stomach by barium meal, showing the organ to be in the left Iliac fossa, the so-called fish-hook variety.

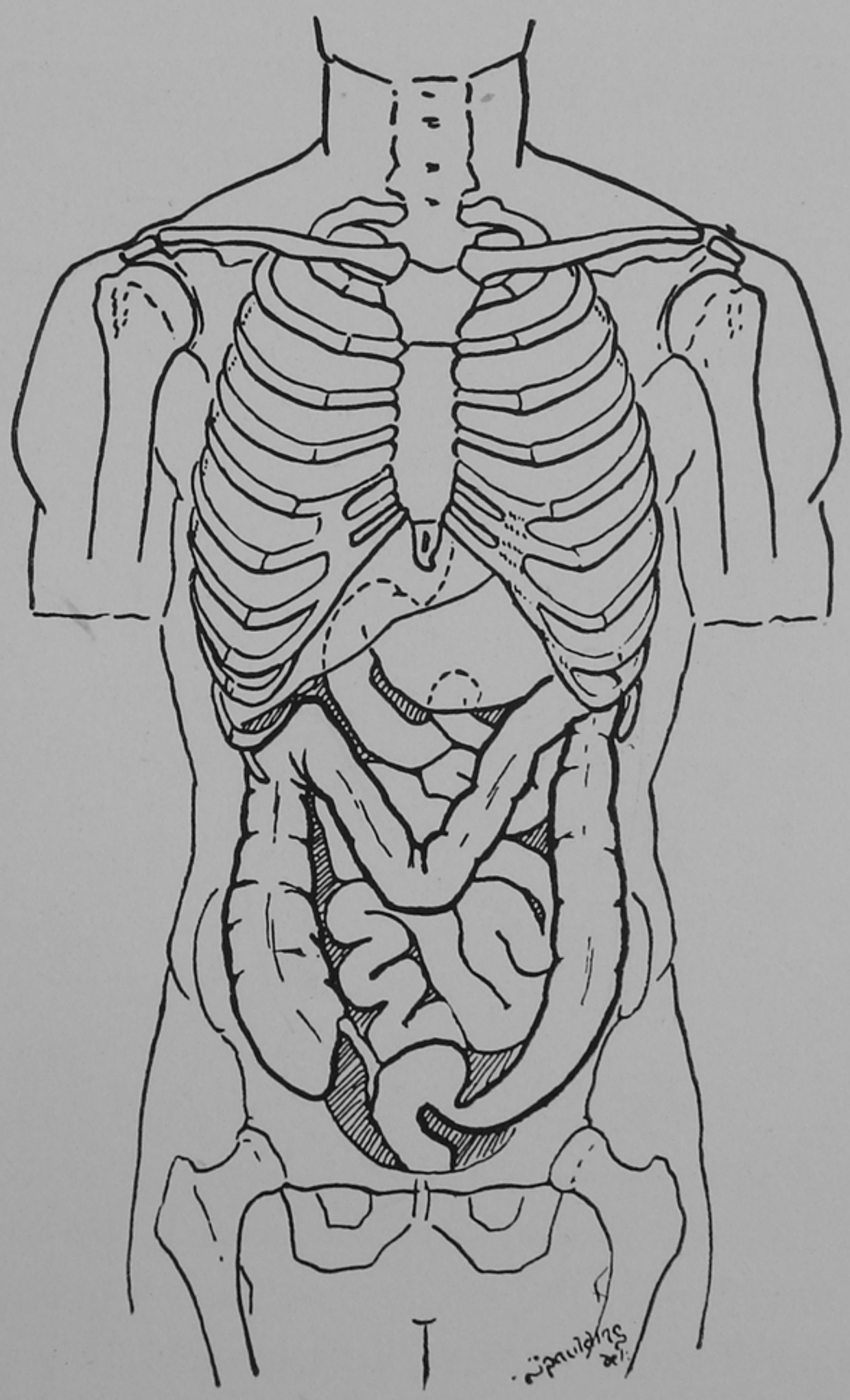
Fig. 36.



Is an example of medium line gastroptosis which alone would not give a clear idea of the shape the caicum or sigmoid where the indications for treatment usually exist.

This is shown for the reason that a single radiograph of the stomach too often is considered sufficient.

Fig. 37.



Shows an example of the Colon, without much apparent Gastroptosis, but a very marked acute angulation at the Hepatic Flexure with a distended Caecum.

OBSTIPATION

Obstipation more clearly defines the condition of the mechanical interference with the normal transmission of bowel contents, and while the stomach may be primarily at fault, it is the colon that gets a deformity, all the way from slight abnormal angles at some of the flexures, to strictures, partial or complete. This condition may also be due to pressure from tumors or other misplaced and enlarged viscera, and adhesions from peritoneal inflammation and the results of abdominal surgery.

That form of proper functioning of the musculature of the bowel so often spoken of by roentgenologists as spastic constipation is usually a symptom due to reflex nervous conditions, possibly connected with Auerbach's *Plexus*, and in the proximity of some physiological or pathological impairment, nerve impulse is transmitted to the muscular fibres that are sufficiently healthy to respond, to produce, and to maintain a local spasm.

Many pages might be written of the etiology and the various existing conditions that lead to faulty, irregular and insufficient elimination of waste material from the intestinal canal. Many authors attach much importance to some impairment of the nervous system, carelessness on the part of a patient as regards regularity, and many other details which have more or less bearing on improper function. Congenital and hereditary influences, in the opinion of the author, should hardly be considered. All agree, however, that the habitual and persistent use of cathartics, errors in diet, and the wrong adjustment of clothing about the abdomen are the important factors to be considered, and with the young and middle-aged are oftentimes corrected by regulation of diet, which is all that is necsssary to restore natural elimination.

The majority of subjects, however, who present themselves to the doctor for relief of one or more of the many ailments, have

as a prominent symptom the inability of the bowels to function properly. If the condition is treated by depending upon the patient's history, without a definite knowledge of the location of the obstipation, the results that would usually follow would be what might be expected from the so-called "shotgun" prescription.

Muscular atony, of both voluntary abdominal muscles and colonic involuntary fibre, are involved and must be considered in outlining methods for restoration. Treatment of abdominal atony can be carried out to more or less advantage by manual massage and by many exercises that the patients can do themselves. Intestinal atony, usually colonic, rarely involves the whole of the larger bowel, but in certain sections, there are well marked defective muscular areas that can be easily verified by the X-ray by barium enema. It is quite apt to be delusive when an attempt at visualizing the colon by a second day exposure with a bismuth or barium meal is made. The principal reason for this is that the angulation at the hepatic flexure is usually so acute and the caecum so distended that there is partial paralysis of its muscular fibre at the splenic flexure and sigmoid. If massage and other manipulations of the abdominal walls to restore tone and overcome the feeble expulsive ability are used, it is still more important that the same principle be carried out where the involuntary muscles have their most defective muscular area. The transverse colon, even if badly prolapsed, often shows well marked peristalsis extending around the splenic flexure, though the angulation seems equally out of position with the hepatic flexure. Fig. 34. Operators who are familiar with the mechanical or electrical attempt at stimulation of the colon, have not failed to observe that much more invigoration, mechanically speaking, is essential on the right side than on the left, because of the local toxaemia there—impairing not only the motor but sensory nerves adjacent.

The treatment of constipation must resolve itself into the recognition of the various factors that enter into its causation.

To make a diagnosis of atonic dyspepsia, "atonic intestinal indigestion", simply gives a name to a symptom, and is in itself, of no special importance.

It is delusive to think that the abdominal viscera are suspended in the cavity by the mesenteries alone, or even with the help of the meso-colon, but they do act to keep the relative position of the intestines and other abdominal viscera, and thus prevent the colon from twisting on itself.

In a normal individual, the abdominal wall is composed of firm, elastic muscles, which maintain more or less constant pressure on the cavity. This pressure, according to Mummery, is estimated to be in some persons ten pounds to a square inch, It is probable that it is always, in healthy persons, more than sufficient to counter-balance the effect of gravity upon the abdominal viscera and that, under normal conditions, the intestines may be said to float within the abdomen, so that no drag is exerted upon the mesenteries. If, for any reason, the abdominal wall becomes weakened, this state ceases to exist, and all viscera are then subject to the effect of gravity and, in consequence, tend to become displaced downward. This is often seen following hysterectomy, and where there has been a sudden loss of fat from the abdomen or the body in general. This is also sometimes seen following child-birth, where the abdominal wall is slow in recovering itself, at which time the liver and kidneys may become more or less loose from their attachments and become prolapsed. Therefore, one of the prominent features existing in chronic constipation, in addition to colonic distortions already described, is the impaired musculature of the muscle layers constituting the support of the abdominal wall; and it is here that abdominal supports, like uterine supports, arch supports, and the like should only be used temporarily as a palliative measure, while something is being done to cause a recuperation of the impaired muscular fibre.

Constipation is chiefly of importance because of the secondary impairment to which it gives rise. The symptoms are very numerous, such as headache, dullness, discomfort in the abdomen, backache, etc., but the most important results of severe constipation is the condition of toxemia called autointoxication. When the contents of the colon are unduly delayed in their passage to the anus, and remain long retained within the body, certain alterations take place. Chemical changes occur in the fecal material and many of the waste products of indican become still further split up into poisonous substances or toxins.

Under normal circumstances there would not be time for the formation of poisonous by-products before the faeces are discharged from the body; but in chronic constipation considerable quantities of these may form while the faeces are still in the colon, and then be absorbed by the bowels and find their way into the blood-stream. The patient, in fact, is slowly poisoned by toxins formed within his own colon.

We have good evidence of the extremely poisonous nature of these toxins in cases of intestinal obstruction. Here, when death occurs, it is more often due to a profound toxaemia from the poisons generated within the obstructed bowel than from the obstruction itself.

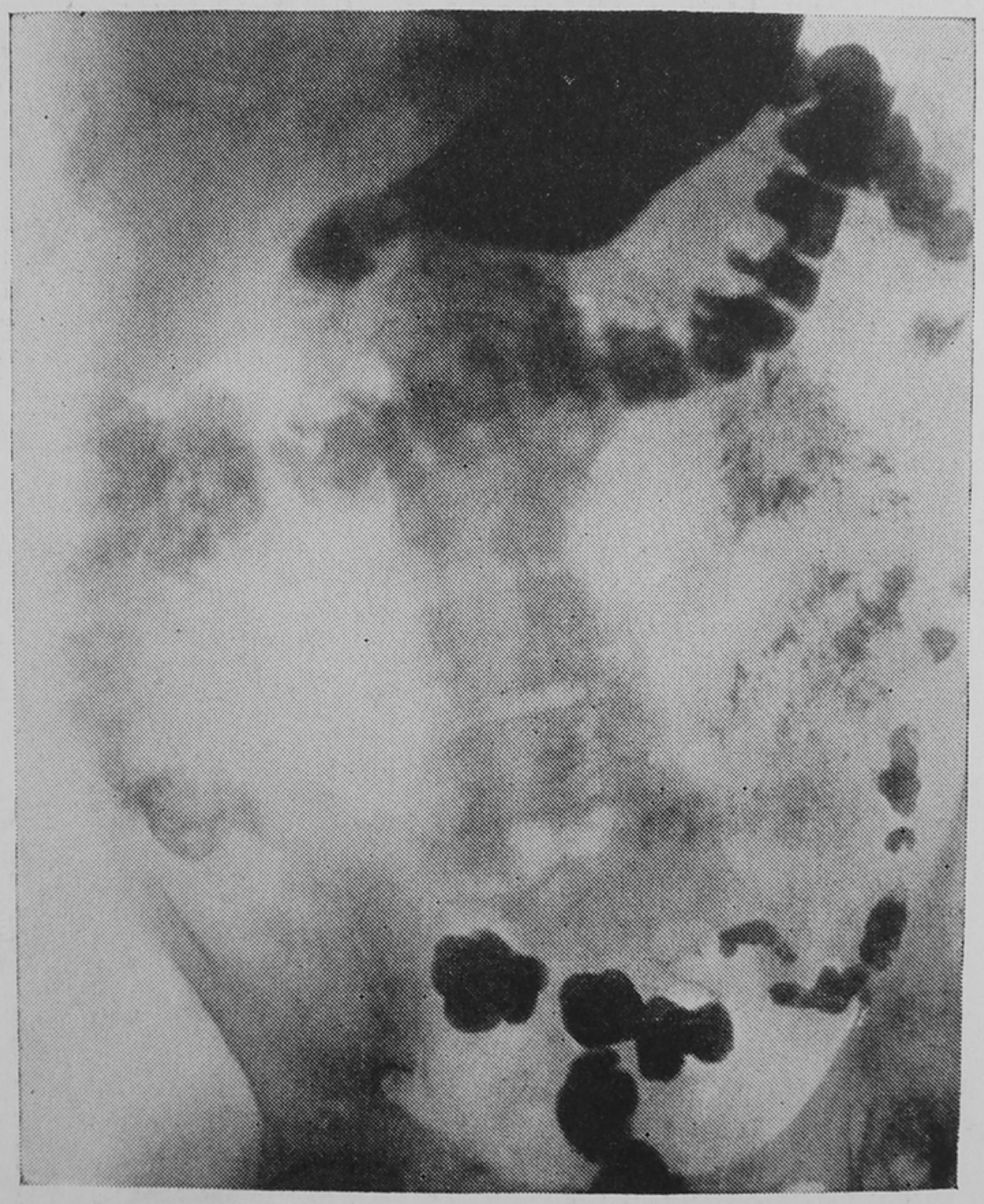
The toxaemia in chronic constipation is never so serious or profound as in intestinal obstruction, because the poisoning occurs more slowly, and the bowel wall being undamaged, absorption does not occur so readily. It often, nevertheless, produces, after a time, very serious consequences.

Fig. 38.



By barium enema, shows a second example of the colonic distortion, with a moderate abnormal Hepatic angle, but much distended Sigmoid. Here also is a disarrangement of the normal position where indication for treatment as outlined would apply.

Fig. 39.



Shows a "better than usual" Colon picture, by barium meal taken after twenty-four hours. Also stomach by barium meal taken at the same time.

Fig. 40.



Figs. 40 and 41 are to illustrate the value of the Radiograph by enema rather than by mouth in the majority of cases where the colon is at fault incidentally before and after treatment cases.

Fig. 41.

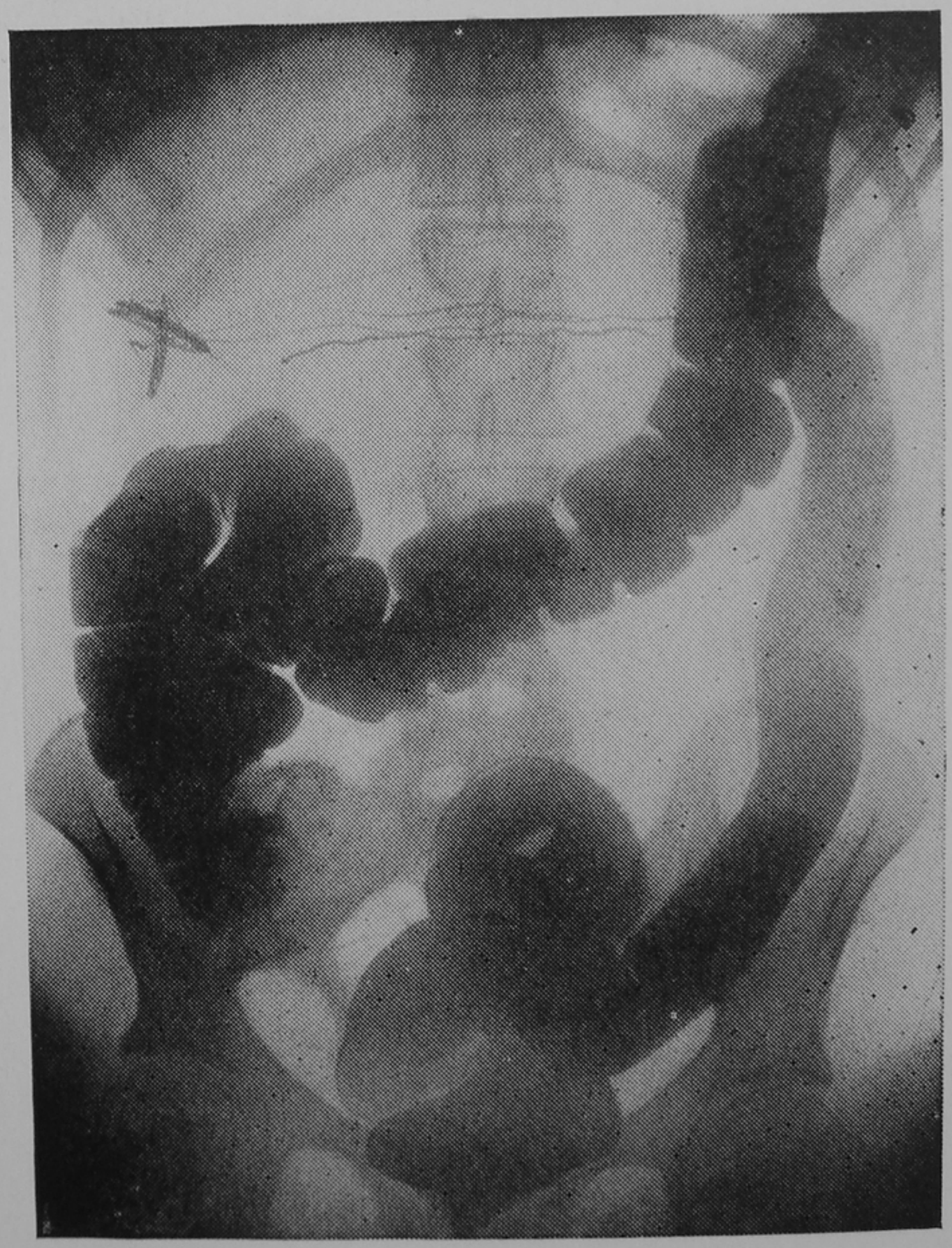


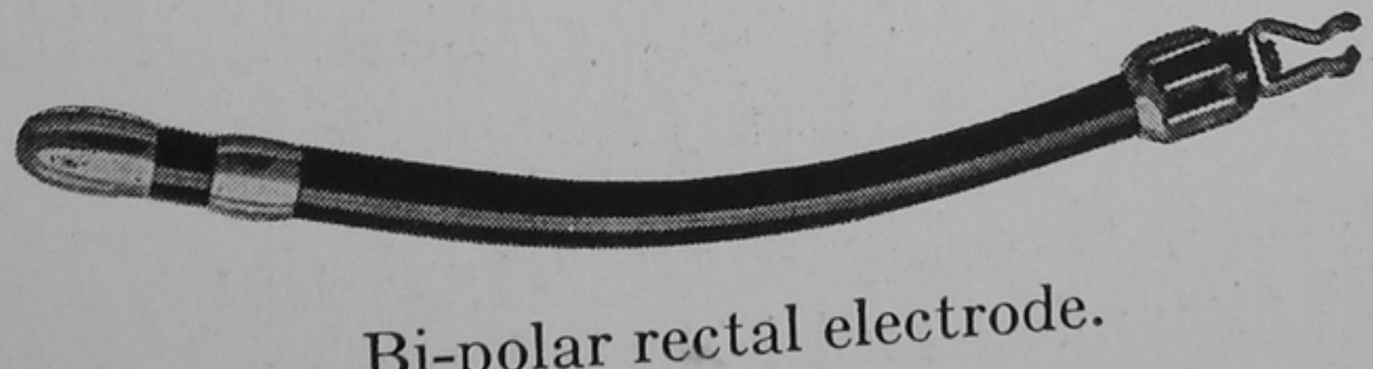
Fig. 42.



Sigmoid Electrode.

Fig. 42 shows the usual form of Sigmoid electrode, made curve to better conform with the part for alternating Sine Current.

Fig. 43.



Bi-polar rectal electrode.

Fig. 43 shows a bi-polar rectal electrode that may be used in conjunction or following the usual Sigmoid electrode in the lower bowel, either for relaxation or prolapsus; produces local invigoration with the alternating sine current.

CAECUM INFECTION

There is probably no part of the body of which there has been so much written and on which so much useless surgery has been done, as in the region of the appendix.

Acute appendicitis, with its well-marked symptoms, both constitutional and local, is almost invariably a call for surgical action. This is especially true in young and middle-aged persons where inflammatory processes often pursue a rapid course, but in the older subject, where there exists what is called recurrent or relapsing appendicitis, appendectomy is in a large percentage of cases unwarranted, based on observation and long experience in Abdominal Radiography.

The position of the appendix is such that when the caecum becomes distended and toxic, it mechanically becomes irritated through friction with the internal crest of the Ileum. The return of the same symptoms that preceded the operation for the removal of the appendix, the recurrent or so-called chronic case, is so apt to occur from six months to a year, that it makes the patient feel, and the doctor possibly think, that the operation was not necessary. Figs. 41 and 45.

A barium enema, showing sharp angulation at the hepatic flexure, the still distended and infected caecum, with a possible ileal stasis, usually explains "why" they think so. The apparently strong statement made might not be justified, if the author had not seen several hundred cases following apendectomy, where the pre-operative symptoms returned and were relieved only when the hepatic flexure was changed from a threatening kink to a more obtuse angle by means of mechanical therapeutics.

It is unfortunate that too often the surgeon feels that if the patient leaves the operating table and the hospital alive and comfortable, the hospital and doctor having been financially rewarded, the operation was successful.

To be sure, during the hospital care, with the post-operative rest, and caution as to over-exercise and diet, the sufferer naturally feels benefited, but when he goes about his business again and takes up active work as a healthy person would hope and expect to do after a surgical session, and has a recurrence of the pain and tenderness in the right side, it is most lamentable and discouraging.

The above is no over-drawn picture, no exaggerated statement, and it is in keeping with the reports of many of our most prominent surgeons that eighty percent of the cases of chronic appendicitis, so-called, should not be operated upon. The modus operandi here employed by the sine wave (alternating) surging treatment should be used with caution about the caecum where diathermy has just been applied, and tenderness is present.

Fig. 44.



A Gastro-enteroptosis mechanically producing a sharp angulation at the hepatic flexure and consequent caecum distention and toxiema.

COLITIS

The term "Colitis" is usually applied to catarrh of the colon, and often it is simply diagnosed as mucous colitis, which may be an "ulcerative" or "membranous" form. Colitis, because of the character of the prominent symptoms, is looked upon as something that is of the nature of a "diarrhea" or "dysentery", that should be checked or controlled, while, as a matter of fact, it is a case of constipation, and the irritation thus caused manifests itself as above described. Radiographic findings, along with other prominent symptoms, make the condition easily recognizable, also a modern electric-lighted proctoscope materially assists in verifying the diagnosis.

The jelly-like discharge so often recognized, caused by the catarrh of the mucous membrane of the colon, is frequently hard to control, as it is one of nature's efforts to get rid of existing toxaemia, which is ever present, and will usually continue, regardless of diet and topical application, until the mucosa of the bowel is so restored in its integrity that it will resist further invasion of the disastrous bacteria. In aged patients, and those of feeble resistance, colitis, unless checked, is likely to lead to diverticulitis and other degenerative changes, and malignancy is usually the sequence.

Diathermy through the entire colon, accompanied by not too vigorous wave current surging treatment through the caecum, with frequent ultra-violet radiation front and back, has often proved efficacious because of the elimination of the bacterias that were continously producing the manifestations in the form of a characteristic product of the infection.

The results of sine wave current treatment will depend largely on the condition of the caecum as far as that portion of the colon is toxic.

It should hardly be expected that the descending colon and sigmoid would be made healthy until the toxic bacteria of the caecum had practically ceased to exist.

Therefore, the treatment resolves itself into diet, local medication and restoration of the tonicity of the musculature of the damaged area.

ILEAL STASIS

Sir Arbuthnot Lane, of London, was the first to bring before the profession a better interpretation of stasis as applied to the intestinal tract.

The word "stasis" has been adopted by writers when referring to any part of the intestines where there has been an inflammatory process, or a retention of eliminative material sufficiently long to have gone through putrefactive processes and resulting infection.

The term, therefore, is a broad one, and to elucidate the subject thoroughly it must be localized to a nicety, or any guide directed to treatment thereto will lack the definiteness which is so essential to the best therapeutics.—Fig. 40.

When a stomach becomes prolapsed, which process is usually over a period of years, certain changes take place in the adjacent tissue and sometimes the surrounding viscera. The right kidney is often misplaced, the duodenum becomes not only depressed but distorted, and consequently its calibre made smaller, and the foundation for future trouble is thus inaugurated. Fig. 34.

The stenosis thus caused may bring about a chronic duodenitis, usually further adding to stomach dilation, because of the longer retention of food therein. The stenosis may become so severe that the only relief is a quick resort to gastro-enterostomy. Duodenal ulcer is another consequence of gastroptosis, and if recognized early enough in young and middle-aged subjects, a

rigid diet, the proper use of galvanism, diathermy, and ultra violet light, may prevent surgery. In the older subject, where general intestinal toxaemia exists, malignancy is very apt to follow.

As has been outlined by the examination of the abdomen for localization of toxic areas, that might explain certain symptoms, plus a verification by X-ray examination, by those who are familiar with the interpretation of radiographs, it should not be difficult to localize the toxic area.—Fig. 45.

Ileal stasis, which as explained necessarily is an ileal toxaemia, and produces certain ill-defined symptoms that are not easily traceable to a source except by X-ray Enema.

Lumbar and dorsal arthritis, and general autointoxication, are often terms applied to indefinite and painful symptoms. Arthritis of the smaller joints, especially the fingers, is often noticed where there is no other manifestation throughout the body, and after teeth, tonsils, gall bladder and colon have been inspected the physician often is at a loss to determine where the poison comes from.

As mentioned, an X-ray of the intestinal tract, taken by barium meal, will not reveal ileal residue as would be determined when taken by barium enema; which still further goes to prove the importance of the method to determine this particular condition.

The physical measures resorted to, in addition to what has been mentioned, will be mechanical invigoration of the stomach, using the technique that would apply to treating the angle of the colon for constipation.

Fig. 45.

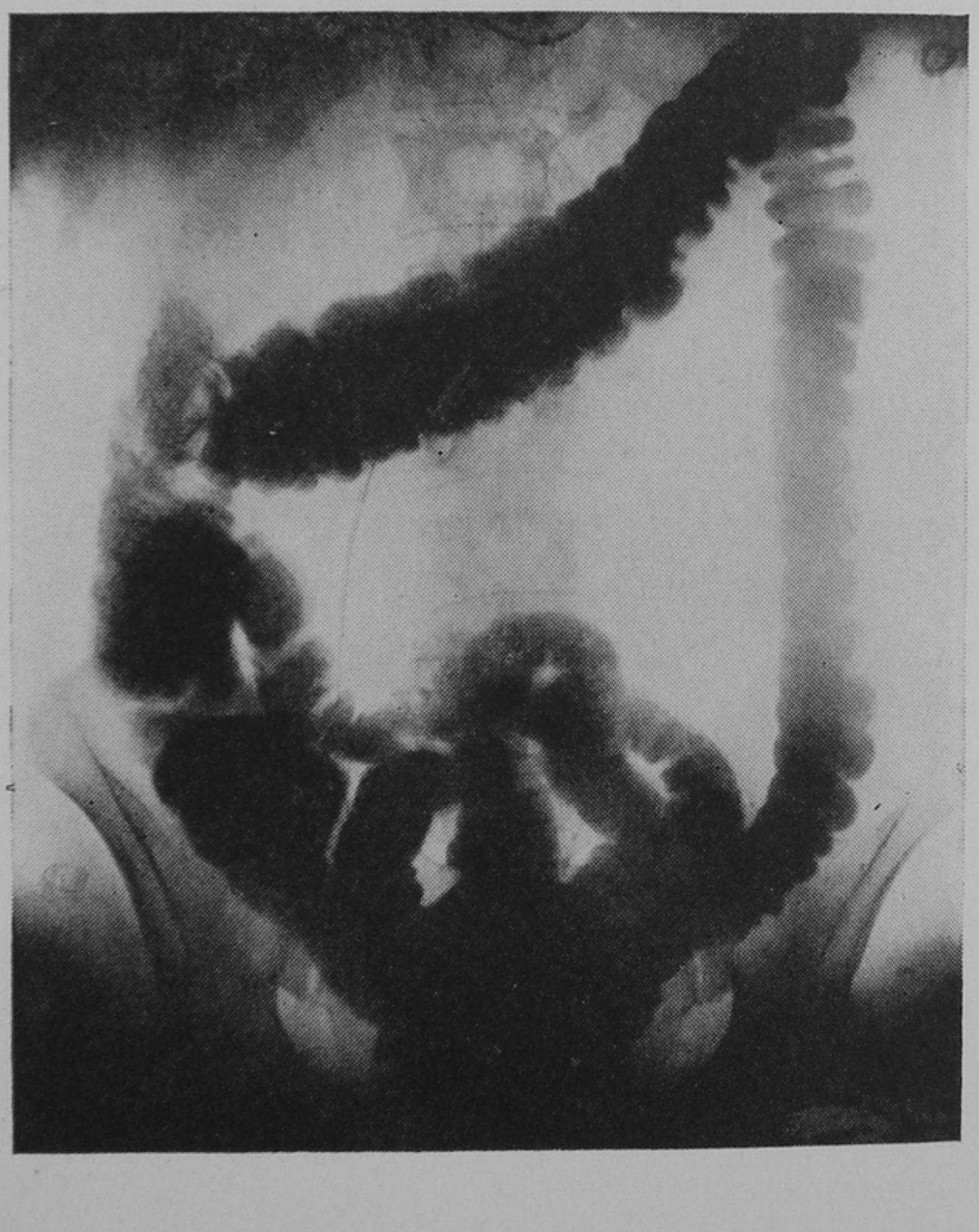


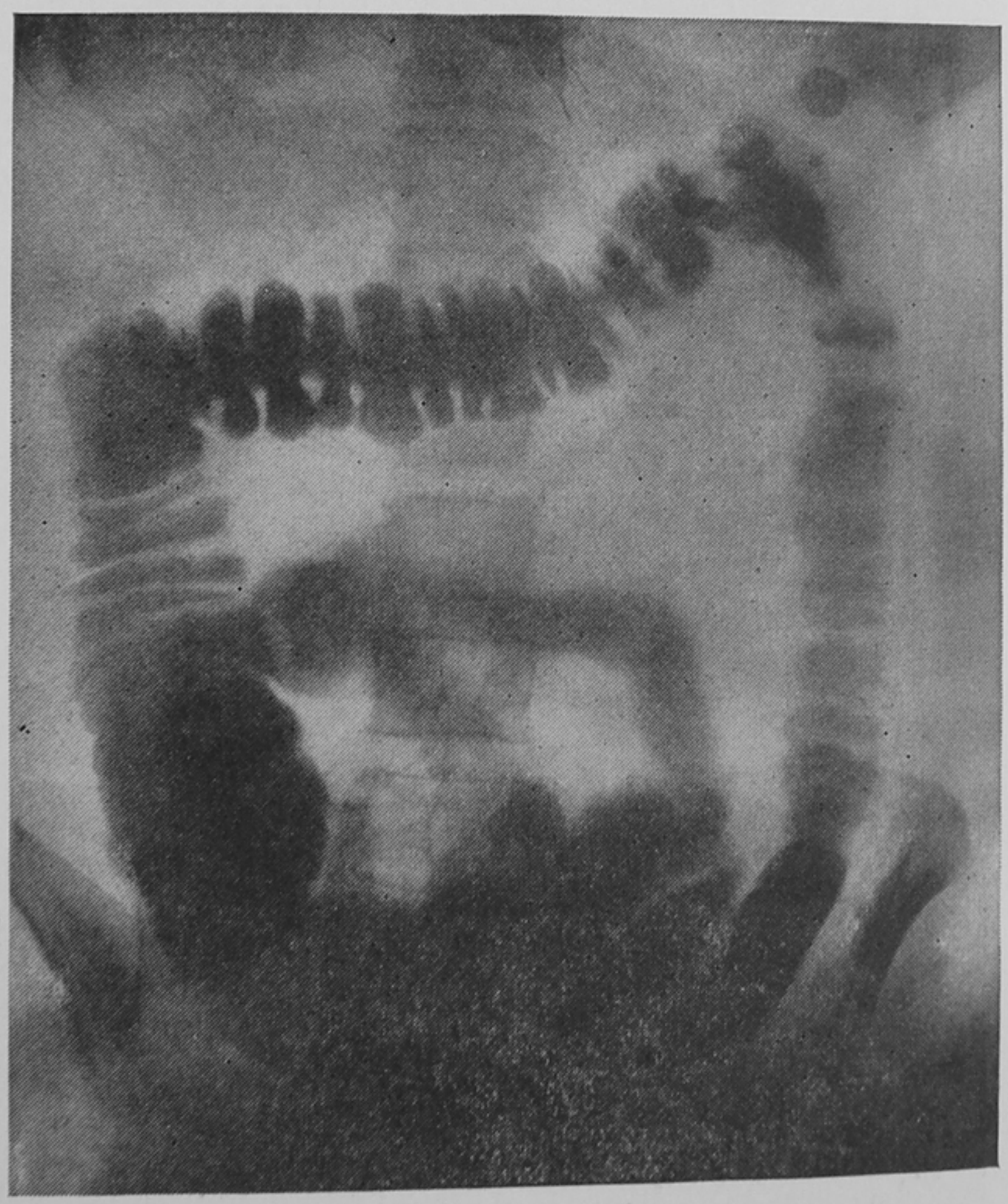
Fig. 45 shows a colon with such a sharp angulation at the Hepatic Flexure that the over-distended Caecum has caused muscular deficiency at the Ileocecal Valve, as shown by the presence of barium in the Ilium, a condition recognized as Ileocecal incompetency, and consequently, Ileal stasis.

Fig. 46.



Fig. 46 shows a condition similar to that shown in Fig. 45 with the exception that the Ileocecal Valve is intact. Same case after treatment by alternating sine wave.

Fig. 47.



Radiograph by barium enema, with well-defined Ileal stasis in a nearly perfectly formed Colon. The patient's symptoms were Arterial Hypertension (186mm), constipation, and more or less general Arthritis.

Fig. 48.

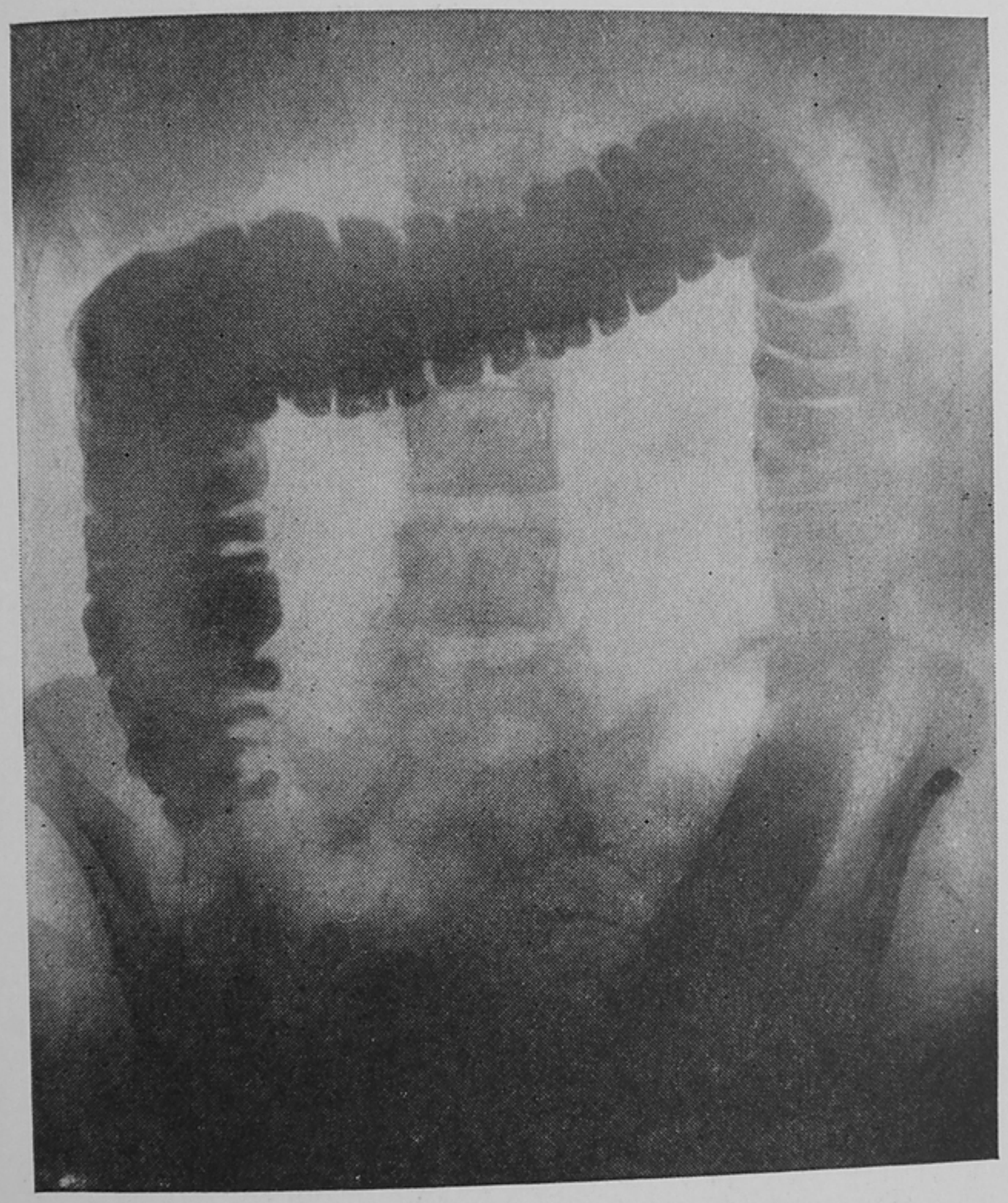


Fig. 48 shows the Radiograph of patient as Fig. 47 after three months treatment with the Sine Wave Current through the ascending and descending colons. It is to be noted that there is a decided improvement in the muscular appearance of the entire colon and a complete restoration of the incompetent Ileocecal valve, and it is quite unnecessary to state that the arterial hyper-tension, constipation, and Arthritis, which were present were entirely relieved and after five years there has been no return of the symptoms.

Fig. 49.



A woman, 55, radiograph taken by barium enema, November 14, 1920. The picture shows well marked Ileal stasis and Diverticulitis of the descending Colon with a distortion that might be almost considered pre-cancerous. The appearance of the tranverse colon showing the smoothness, consequent atony is conspicuous. Constipation very severe and the patient complained of Arthritis in the right knee and Neuritis in the right facial nerve. Blood pressure 198. The general appearance was one of marked autointoxication with corresponding general lassitude.

Fig. 50.



Same picture as Fig. 49 after 29 days, during which time sixteen treatments were given. The relief of all symptoms was very marked in one month, i.e., five carthartic pills daily were superseded by a tablespoonful of mineral oil twice daily; blood pressure reduced from 198 to 172, and all painful symptoms relieved. The incompetent Illeocecal Valve was apparently nearly restored and a tonic appearance was in evidence throughout the whole colon, where previously existed marked atony. The restoration of the tone of the parts is easily recognized. Arthritis, Neuritis, and Constipation were much relieved. The radiograph was taken Dec. 11, 1922 after sixteen treatments. The Lesson to be learned from figure 49 is that a pre-cancerous condition existed in the descending Colon. Fig. 50 shows a relief in the "kink", thus surgery was avoided. The patient died in 1926 of Myocarditis and the attending surgeon informed the writer there was no return of the auto-intoxication or the necessity of drug carthartics.

The lesson to be learned from such results is sufficient to warrant one's going ahead with the treatment by surging wave currents even if the prospects of much benefit are discouraging. With high Arterial tension existing in the case described, combined with a general toxic condition throughout the body, the patient could hardly have been expected to survive the proposed operation for the removal of a portion of the descending colon, which surgically seemed to be indicated.

Fig. 51.



Radiograph by barium enema, showing Ileal stasis where the appendix had been removed one year previous.

Fig. 52.

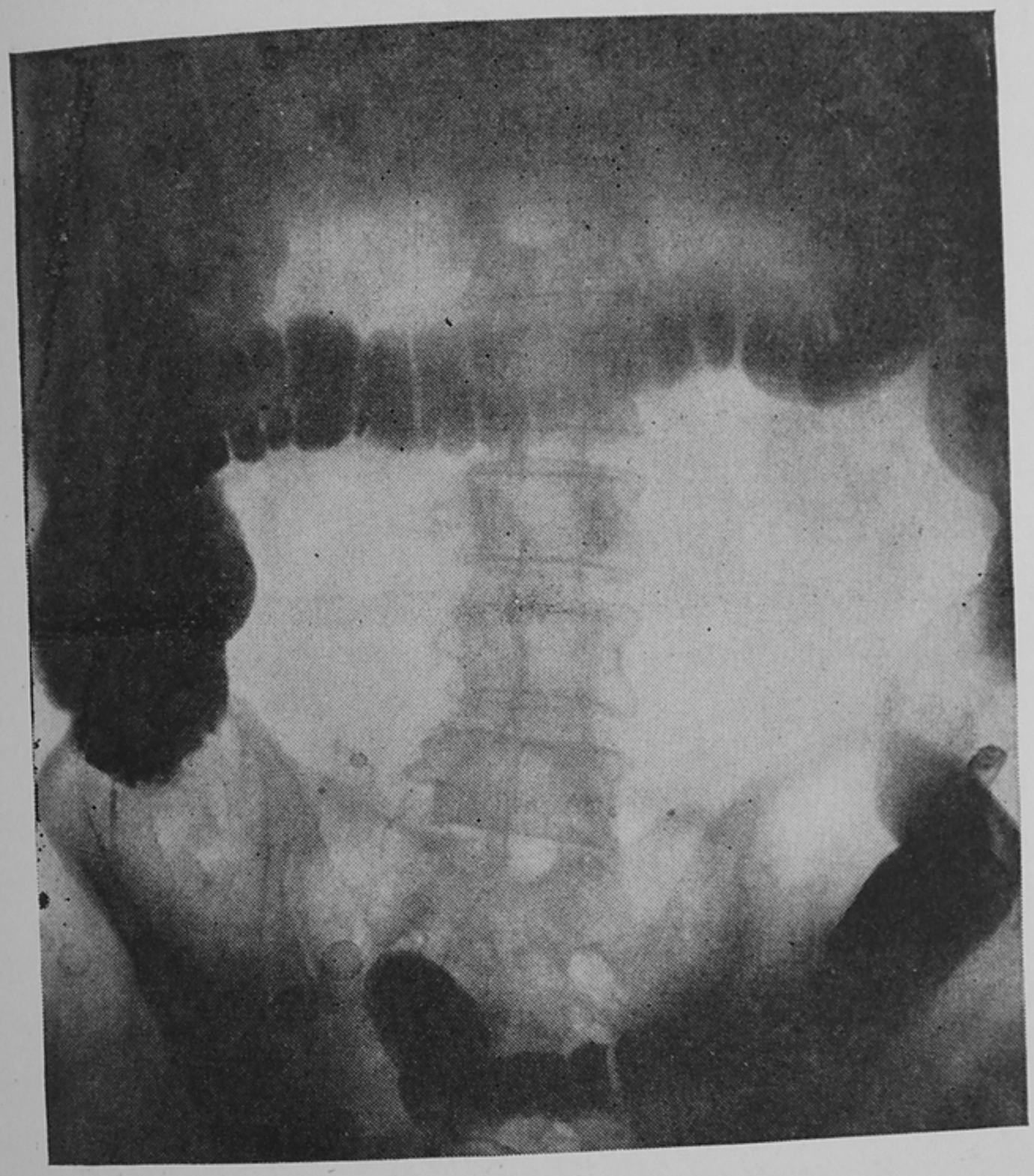


Fig. 52 shows same picture as Fig. 51 after four months' treatment showing improvement in the general tone, of the colon is noticed with a relief of constipation and existing Arthritis. This is one of the hundreds of similar X-ray pictures which the authors' files show, as a proof of the advisability of not operating for chronic Appendicitis just because there is a pain in that region, until the position and condition at the Hepatic Flexure has been ascertained.

THE SIGMOID

One who has read the recent writings of such physiologists as Alavarez, Rabachow, and Cannon on the mechanics of the intestinal tract, and the way in which function is impaired when the original mechanical program is interfered with, should easily understand why, in a larger proportion of cases of intestinal toxaemia, the sigmoid plays such an important part.

Nearly twenty years ago, Dr. Gant, of New York, wrote a volume on rectal diseases, in which he devoted one short chapter to the relation of the colon to diseases and impaired function in the sigmoid and below. Recently, the same author has given to the profession three elaborate volumes consisting of over fifteen hundred pages on the same subject, and he has written nearly five hundred pages on the colon as a factor of importance in diseases of the sigmoid and rectum.

The significance of this, from such an able authority, gives great credence to what is said in this book on the importance of localizing the toxic areas of the colon.

When outlining a therapeutic procedure, physicians doing radiographic work in conjunction with physical therapeutics have frequently observed adjacent viscera relieved and apparently cured, that seemingly had no relation to the sigmoid—and the author has seen it verified daily in his own office work. This applied to cystitis, hemorrhoids, irritable prostate without enlargement, and some forms of uterine displacements. It has been repeatedly observed where the persistent use of uterine pessaries, tamponade, and topical applications within the rectum and vagina fail to produce results, that with the restoration of the position of the prolapsed sigmoid it has been given tonicity, and just in proportion as the prolapsed pelvic colon has been relieved of its impaction and sagging, these patients have been free, in a degree, of the previous distressing and painful pressure symptoms.

This, of course, does not apply too generally, because surgery has its place and must be respected. But, like similar conditions, removing the symptoms without removing the cause is quite apt to bring a recurrence of the trouble, with disappointment for all concerned.

Fig. 53 is a good illustration of a sagging and at times impacted sigmoid causing not only local and general infection but more or less pain and other symptoms by actual pressure.

Fig. 53.

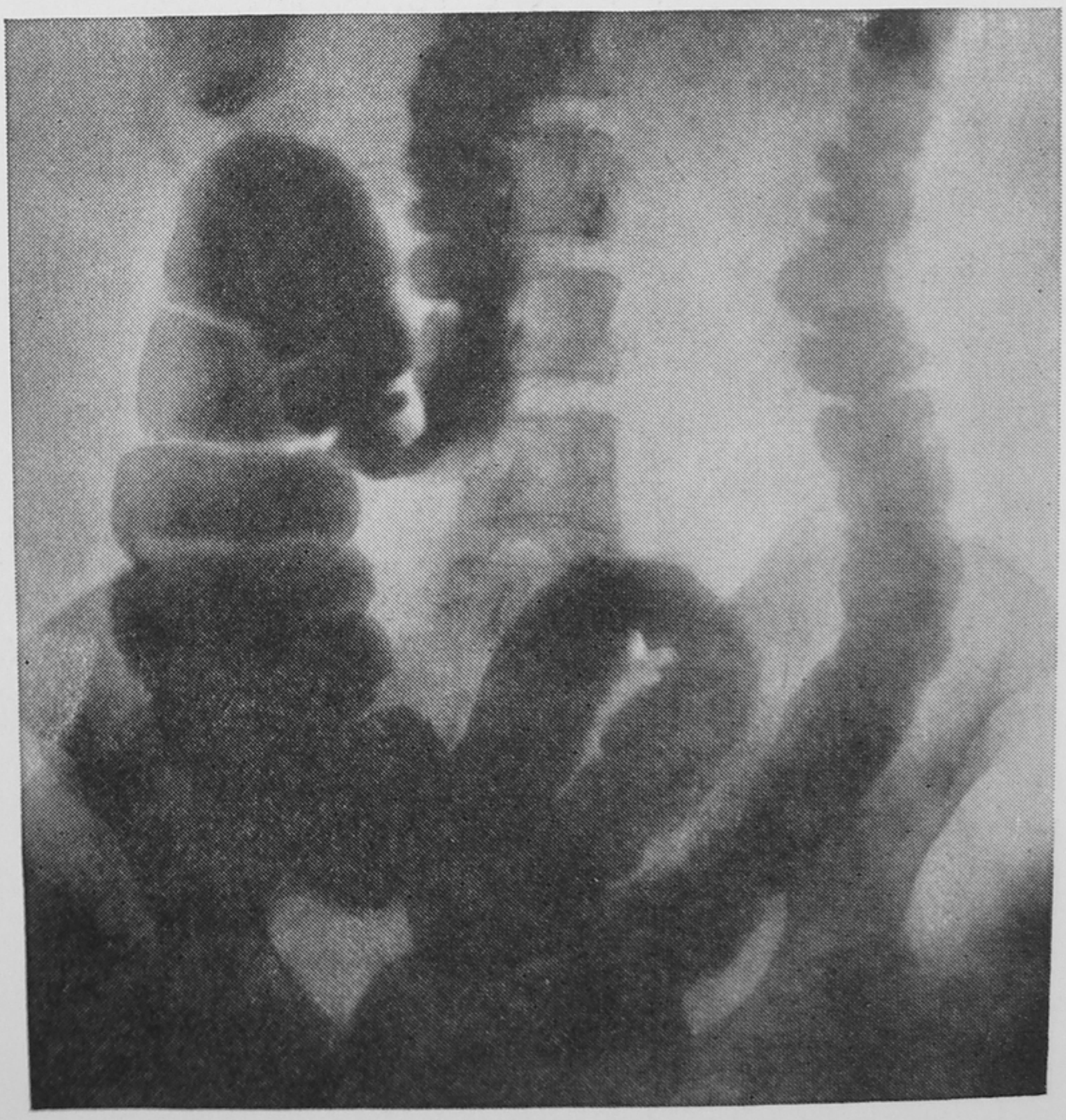
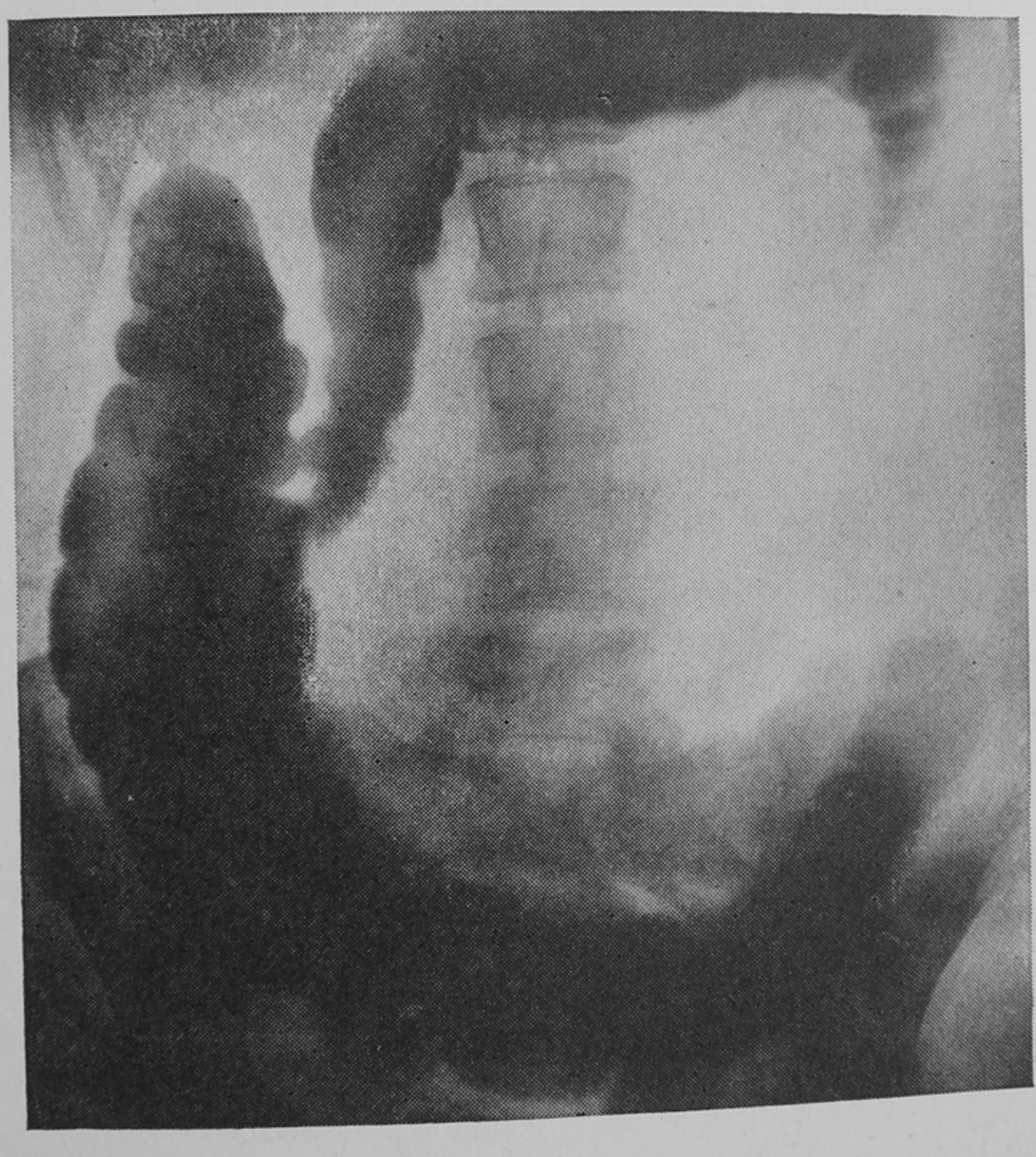


Fig. 54.



Same case as Fig. 53 after Rectal treatments by Alternating Sinusoidal Wave methods. The sharp angulation below the Hepatic Flexure was of a traumatic nature (old adhesions) independent of the Sigmoid for which the cut is used.

Fig. 55.



Radiograph of the Colon by barium enema shows a very marked prolapsus of the Colon through the left Iliac Fossa, extending to the crest of the Ilium, indications that the stomach prolapsus, which shows the primary cause, must have been of the "fish-hook" variety. Sine Wave Current administered through the Hepatic and Splenic Flexures, alternating with a Sigmoid electrode, gave quick relief. See Fig. 42.

Fig. 56.



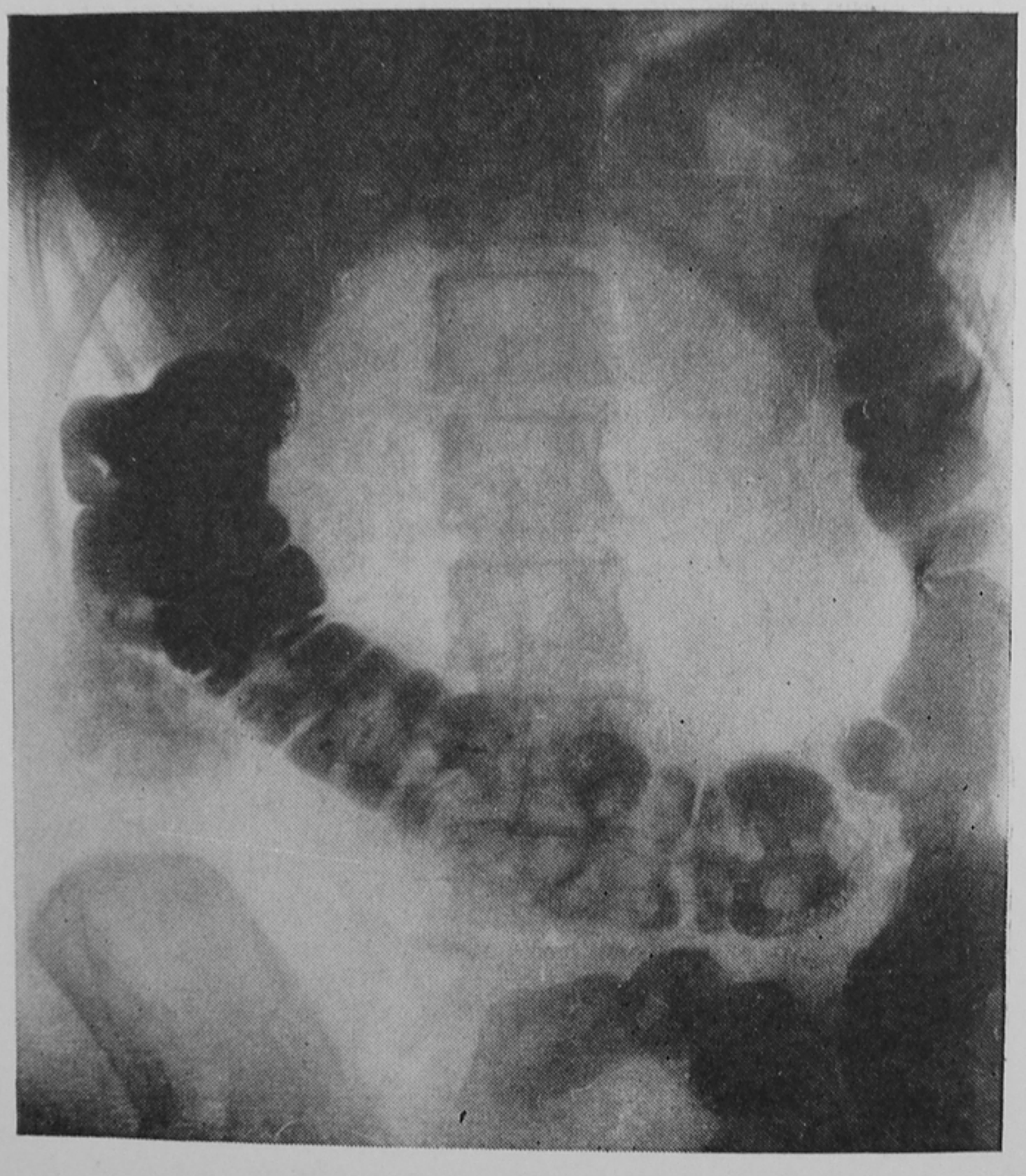
The results of treatment of Fig. 55 are shown in Fig. 56, blood pressure was reduced from 210 to 162, carthartics discontinued because not needed, and relief of usual distressing symptoms that accompany high arterial tension. Any surgeon or one familiar with radiographic teachings can easily see such a condition was drifting toward malignancy. Therefore, it is fortunate if these and similar conditions can be discovered and treated before the existing toxemia produces the common results; namely, nephritis, myocarditis, and an earlier demise before degenerative changes take place.

Many intestinal radiographs may be copied from the author's X-ray films, still further illustrating the importance of recognizing where it is essential to change certain kinks to curves; however, the foregoing illustrations for one who is at all familiar with the interpretation of visceral radiographs should be sufficient to see the importance of such teaching.





Fig. 57.



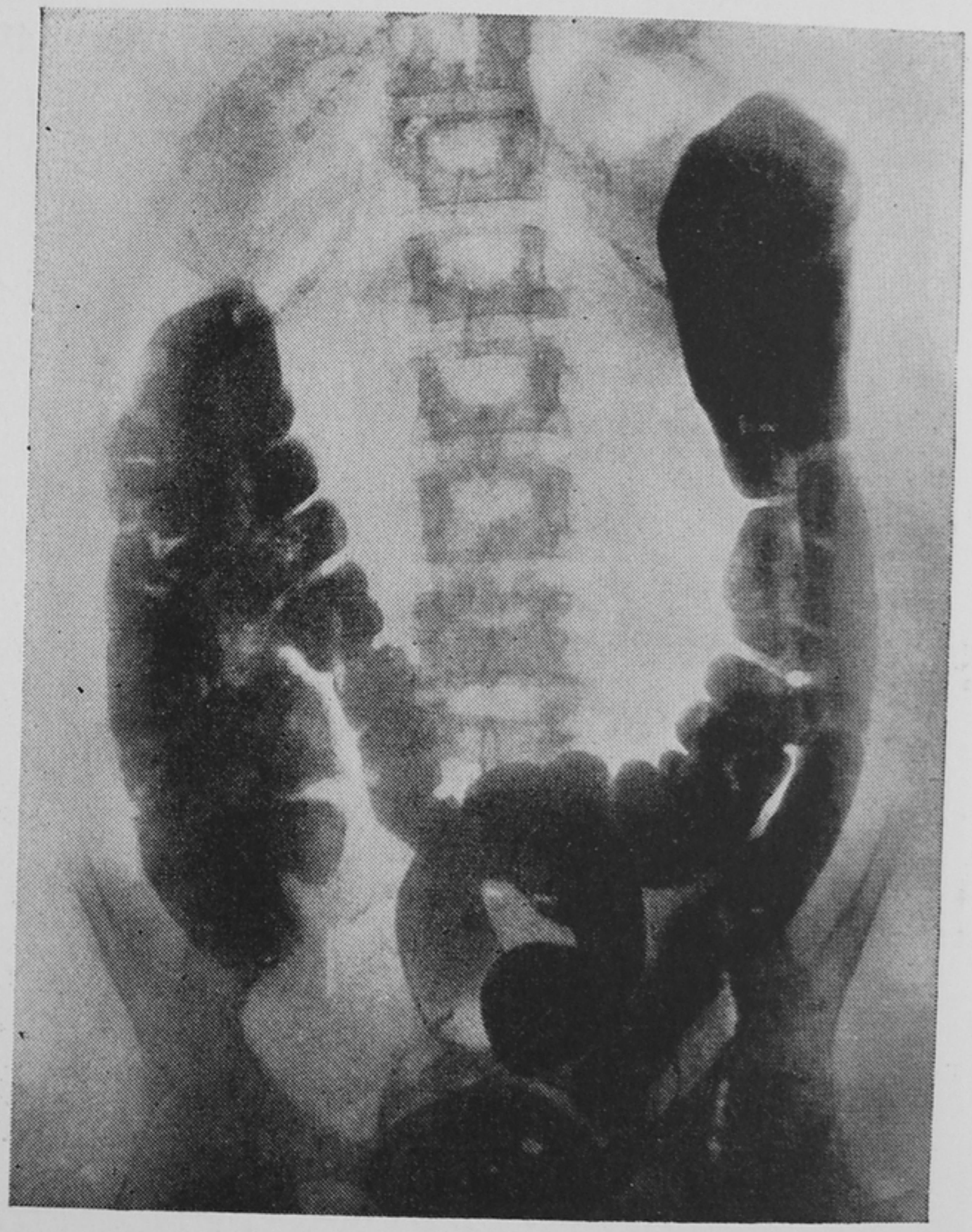
Barium enema of the Colon, represents a sharp angulation of the Hepatic Flexure, with depression of the tranverse Colon into the left Iliac Fossa, after four months' treatment through the Hepatic Flexure with small electrode in front and larger one on the dorsal region, followed by a large surface electrode in front over the descending colon and using the Sigmoid electrode.

Fig. 58.



Fig. 58 is the same patient as described in Fig. 57 having received twice-a-week treatments by the Alternating Sinusoidal Surging Current through the Hepatic and Splenic Flexures, also per rectum with the Sigmoid Electrode. The Constipation, and painful pressure symptoms were removed; the blood pressure which was 214 at the beginning of the treatment was 154, when the second Radiograph was taken four months later. One can draw on their imagination what the patient's condition would have been if a functional restoration of the colon had not been instituted.

Fig. 59.



X-ray of the Colon, showing a complete Enteroptosis extending nearly to the pubes. The severe acuteness of the angle at the Hepatic Flexure with the distended Caecum, indicates that something along radical lines should be done to prevent possible malignancy in the near future; the age, sixty, and diminished resistance of the patient prohibiting any effort by surgical means and restoration of partial function by physical effort would be all that could be reasonably hoped for.

Fig. 60.

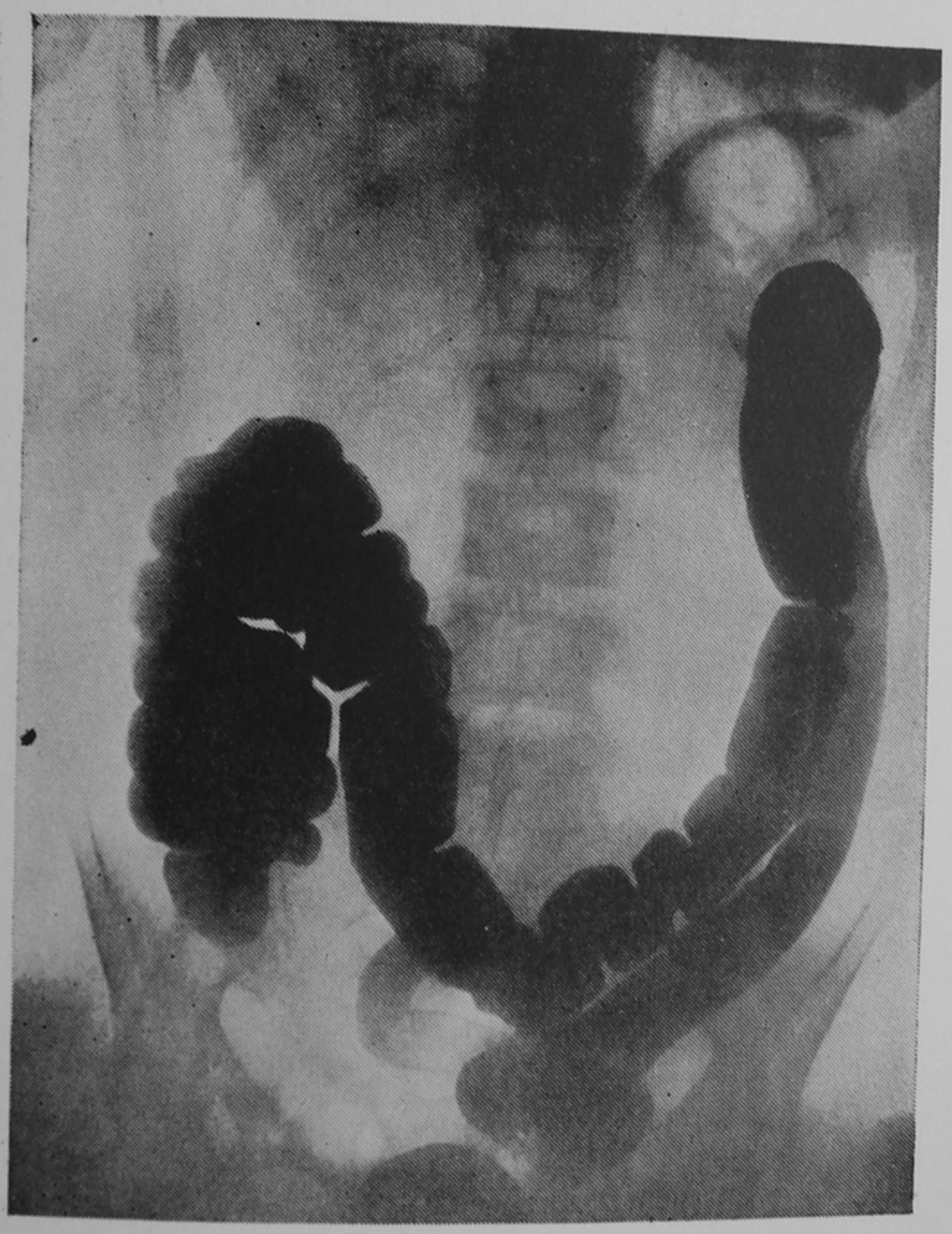


Fig. 60 shows the same patient as Fig. 59, taken three months later, having received two treatments weekly by the method described elsewhere in similar prolapsus of the stomach and Colon.

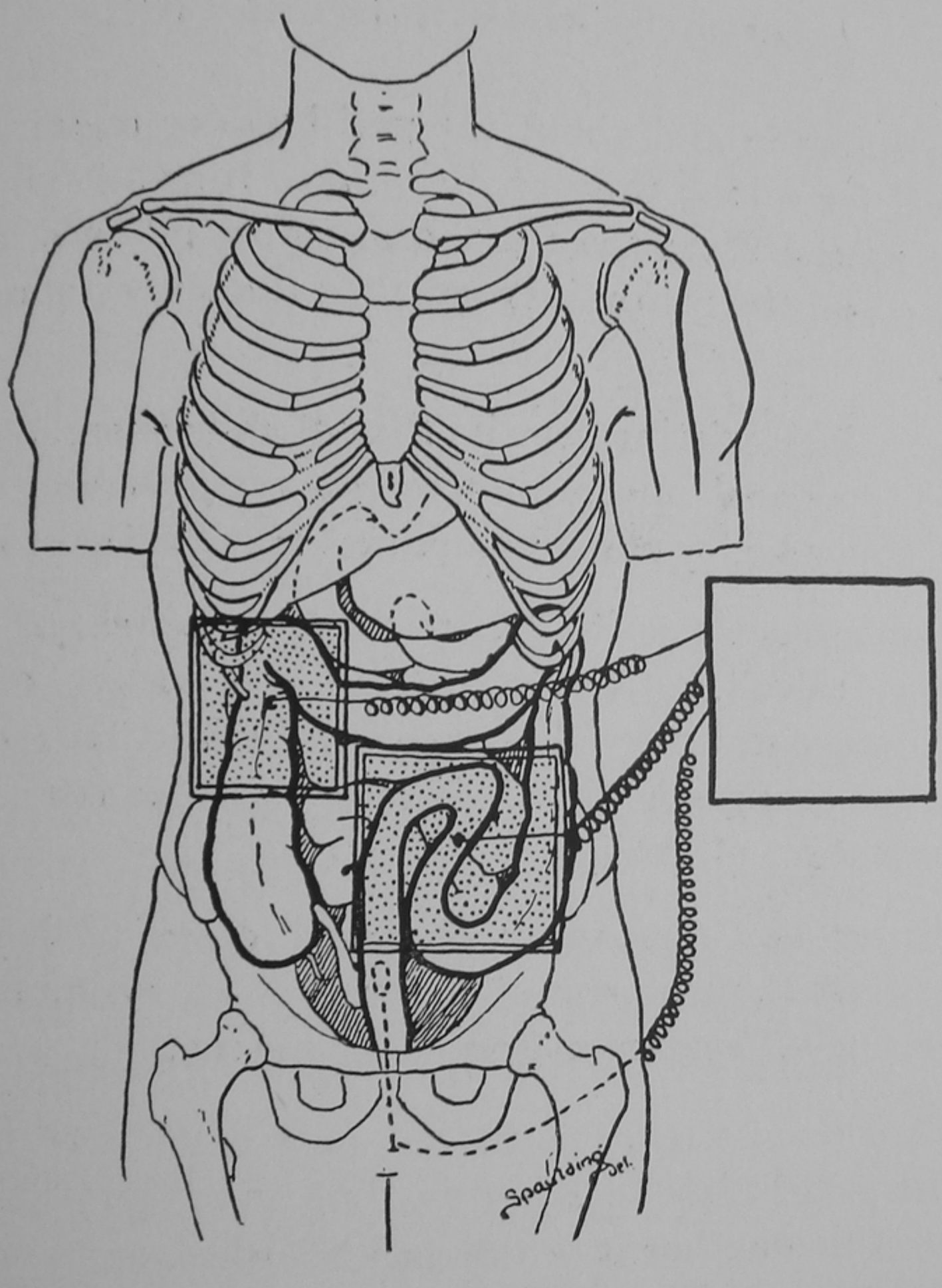
Fig. 61.



Taken by barium enema one year after Fig. 59 and six months after Fig. 60, shows a still more proportional increase in volume. In the meantime, the patient (a lady of sixty years of age) had improved in weight, strength and general appearance. The results do not show very marked anatomical change, but as the physiological function was much increased, this proves the effort toward restoration was not entirely futile.

On the principle that modern scientific medicine is preventative medicine, this seems to be the kind of a case where much may be done to prolong life and prevent what would seem inevitable, namely malignancy in or about the region of the Hepatic Flexure. The inadvisability of surgery in cases of this type is obvious; the continuous use of cathartics, the inability of abdominal supports to do anything other than harm, behooves the physician who has his patient's interest at heart to make an effort with the modern means at his command to try to restore some lost muscle tone, or else throw up his hands and say "it is the will of God" and let the poor soul slide into Eternity via the malignancy route without an effort to prevent or retard the degenerative changes, where a sufficiently sharp bowel angulation obstructs circulation.

Fig. 62.



In Fig. 62 will be seen an illustration of the Surface Electrodes for treatment of conditions of abnominal colonic angles. The technique as to size and position of the abdominal electrodes must necessarily vary with conditions present. For instance an electrode over the Hepatic flexure 4 by 6 inches on a tall subject would be indicated while short person would require only a 3 by 4 inch size. The dorsal surface electrode should always be larger and at a higher level than in front that the desired impulse may be parallel with muscular and nerve distribution. The rectal electrode should be used with the largest size moist surface electrode so that the Sigmoid may have a concentrated effect. The cut, as might be imagined, does not mean that all three cuts be used at one time, but it could hardly be arranged otherwise to explain the modus operandi.

GALL BLADDER INFECTION

Disturbances in and about the gall bladder region have been recognized for a long time as a separate form of infection that calls for special diet; they are sometimes relieved by certain medicines; and the region is frequently the site of surgical intervention.

The pathology existing may be that of gall stones, malignancy, extensive duodenal ulcer, inflammatory processes extending from the appendix, or possibly a pancreatic disease of some kind.

The X-ray sometimes does, through oftener does not, reveal the presence of calculi. Cholecystitis is a condition of infection before the stage of bacterial changes in the bile itself, or possibly degenerative changes in the walls of the gall bladder, leading to actual formation of calculi.

The writer has repeatedly observed cases of infected gall bladder relieved and apparently cured of all symptoms after a toxic caecum of long standing is overcome.

The usual diagnosis by palpation, percussion, and the history of the case is very apt to be misleading as to the true condition, and also as to whether it is the gall bladder *per se* or toxaemia in the immediate region, which is the real cause of the disturbance.

Recent discoveries of better X-ray methods by the use of sodium tetraiodo phenolphthalein shows the outline to a greater nicety of the area of gall bladder distention, which permits sharp distinction between surgical and non-surgical indications.

Dr. Burton B. Grover, of Colorado Springs, and others have reported quick relief and apparent elimination of symptoms by the use of the surging wave current. The effect, of course, was purely mechanical, and the result obtained must have been brought about by restoring the tone of the muscle walls weakened

through the infectious process, as might apply to intestinal stasis or any other portion of weakened muscular fibre from any other cause.

It can be easily seen that there are many conditions where the method would be harmful, but when calculi, malignancy, and the like have been eliminated, the method is worthy of consideration.

The application of the sine wave current through a gall bladder may be the cause of immediate pain or extreme tenderness with or without actual pain, that may last for several days. Should there be such an occurrence, it would be wise to relinquish treatments at once and make absolutely sure that gall stones are or are not present. The very fact that a deep mechanical action was produced will often elicit the information that gall stones are present, or that there are indications of such a nature that further applications should be discontinued, or used later after acute symptoms have subsided.

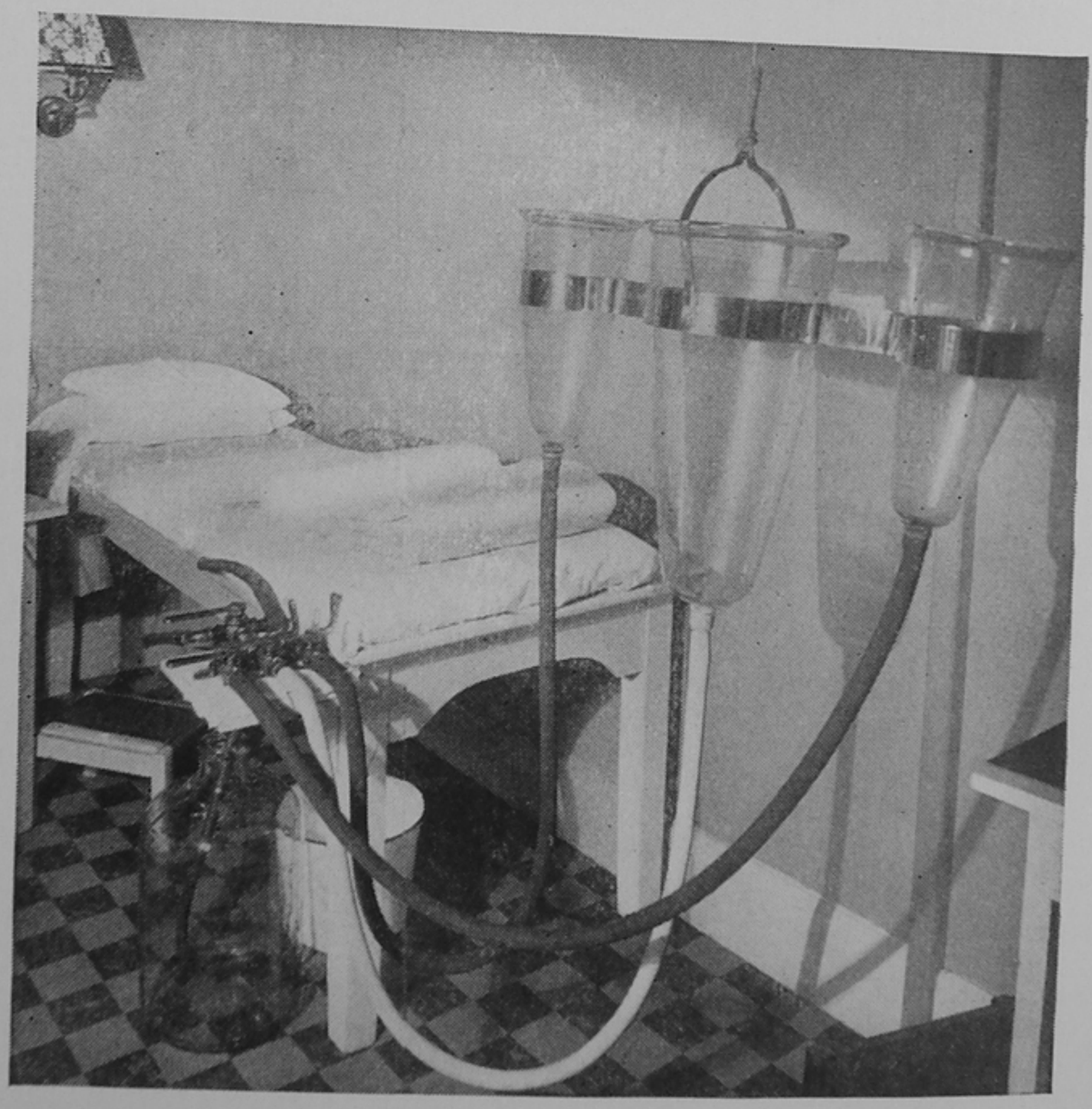
In making application through the gall bladder, using the usual moist electrodes with the larger one on the back, it would be good technique to have the dorsal electrode placed higher than the usual application for treatment of caecum infection as described elsewhere.

COLONIC FLUSHING AND INTESTINAL IRRIGATION

Irrigation of the colon by flexible rubber tubes of different lengths and sizes is called by some manipulators of the method "colonic flushing."

The usual process, and the one to which the writers refer, consists of an apparatus whereby large glass reservoirs containing three to five gallons of water, adjusted by gravity apparatus to maintain a constant pressure through a tube sufficiently large that the returning fluid may, by adjusting a valve, be deflected into a receptacle where the contents may be examined if desired. Salt or any medication may be added to the water as the conditions indicate.

Fig. 63.



Is a design of a Colon flushing apparatus by means of which a cleaning of the colon, especially the pelvic portion, is accomplished in a very thorough manner. There are other and more elaborate designs obtainable but the principle is the same.

Physicians and others doing this form of colonic cleansing claim almost universally good results in arthritis, high arterial tension, and many other conditions where colonic toxaemia is the apparent cause of the symptoms, painful or otherwise.

The late Dr. Seltzer of Philadelphia carried out the above program in all his cases of intestinal toxaemia, and in addition, he followed the flushing by the use of alternating wave generator surging treatment as has been described, claiming that his results were double what they would have been had he used either method alone.

The principle is plausible, and where it can be so arranged to use the double method as referred to, it certainly lessens the time of treatment for the relief of constipation.

Water is an essential constituent of the living organism and must be constantly supplied to replace that which is being lost. The chemical changes taking place in the tissues are reactions between dissociated molecules in a weak saline solution. Hence, any considerable drying of the body would arrest all vital processes. When a man is deprived of food, he is able to live for a considerable period upon his own tissues.

The elimination of water takes place in the urine and faeces and from the skin and lungs. The tissues retain approximately the same quantity in health, so that with a sufficient supply, the amount of water lost is determined by the amount taken in; if enough water is not available to make up the minimum loss, thirst arises.

Variations in the loss of water are chiefly due to evaporation from the skin, for this is the means by which any excess of heat is dissipated, and the temperature kept constant. The amount of water in the urine, if the diet be the same, will vary inversely as the loss from the skin, and therefore in hot weather the urine is scanty, and in winter, abundant. The total loss of water from all sources is rather more than the quantity taken in the food, for the oxidation of the hydrogen of the solid wood produces

a half pint or more which must be eliminated. The average quantity evaporated from the skin and lungs in a day is about a pint and a half, two-thirds of which is given off from the skin; this total increases very much with active movement and may be over half a pint in an hour, i.e., ten times as much as is lost in that time during rest. The drinking of an increased quantity of water does not, apart from muscular exertion, lead to a greater evaporation from the skin, but the extra quantity appears in the urine,—that is to say, other things being equal, water has a direct diuretic action. The evaporation from the skin is determined during rest by the needs of the regulation of heat and not by the amount of water taken in.

It is a well-known fact that the average person does not drink a sufficient amount of water. It is also true that a large proportion of people living in cities and large towns depending upon the city water supply for their drinking water, which unless cooled by ice or allowed to run a considerable time from the faucet before taking, is usually more or less unpalatable, the result is that tea, coffee, and other decoctions and concoctions furnish the daily amount of liquid taken into the system. People living in the country where deep well and spring water is more available, doing different kinds of labor causing more or less perspiration and thirst, which is offset by large quantities of pure water, are less likely to have intestinal poisoning and its many sequences, such as the so-called rheumatism, arthritis, neuritis, and constipation.

It is noticed that young and middle-aged persons who are chronically constipated, as they call themselves, and are habitually addicted to the use of cathartics during a greater part of the year, find that during their summer vacation in the country their constipation is forgotten, which condition often continues for several weeks after their vacation is over.

The body is constantly producing heat and giving out heat, and the mechanism is so marvellously arranged that the temperature of the whole system is adjusted so as to be higher than that

of the surrounding conditions, and from time to time it is necessary that the body should take into itself certain substances known as food, being in the main similar to those which compose it and through chemical efforts and oxidation, change into energy to be utilized where most needed.

So much for the first part of the metabolic process. The other consists in the elimination of waste matter and deleterious substances which may be broadly described as the products of oxidation of the substances taken in the food or decomposition of parts of the body itself.

Hence, the living structure to maintain normal nutrition must not only take in and assimilate in proper proportions materials for repair, but deterioration, which may be called under the heads of congestion, inflammation, and over-retention; the result of which is to disarrange the original plan of a healthy mechanism from maintaining its equilibrium.

Now when these abnormal conditions occur externally in the form of acute inflammation, abscess, some skin affections, and where proper medicinal applications or surgery might easily control the situation, the solution is simple. But when non-purulent infections invade the inaccessible areas, which we call tissues, and which may come under the head of muscular, nervous or connective, as variously arranged in different organs, then the process of getting rid of the local stasis before it has time to cause secondary degenerative changes is the most important consideration of the physician.

Without being too comprehensive,and elaborating, upon the various positions and conditions of localized intestinal stasis, from the most prevalent and perhaps better understood example of defective elimination, so long as these local stases, usually due to errors in diet, occur in young, middle-aged and healthy subjects, nature, with her wonderful powers of recuperation, elasticity and protective lining of the digestive tract, may adjust itself, and the slight disturbance is passed over and forgotten. However, in the

less fortunate, as far as diet, nature of occupation and construction of the body is concerned; or in older subjects, whose powers of elimination grow less and less, and ability to absorb more and more, the condition changes from one of physiological activity to pathological significance, and before it has become a surgical necessity, then is the chance for the physician to step in and either prevent or defer the inevitable.

Therefore, a pure assimilative water in sufficient quantities so that the tissues become fairly saturated, and while in situ, mechanical stimulation in any form the physician thinks best or has at hand, will not break down adhesions and cure ankylosed joints, but will do what drugs can not do, and more than if the same mechanical or electrical process were instituted, and the tissues under consideration practically starved for the want of nature's own solvent to help set free the poisons.

Even the systematic drinking of ordinary water is employed for remedial purposes. In this connection, weight must be given to the thermic and chemical effects of the water which have an influence directly upon the organic economy and the temperature as well as upon metabolic processes.

Water, when introduced into the stomach, is readily taken up by the body. It remains in relation with the body for a considerable period of time, and through the stomach and the intestinal canal it enters into direct contact with the most diverse portions of the digestive apparatus. By reason of the equalization of its temperature with that of the body, as a result of absorption into the fluids and the blood-mass, and by reason of its chemical constitution, water must have an especial effect upon the most intimate nutritive processes. When taken internally, water will play an important role, also as an inhibition material, inasmuch as it enters and penetrates all of the tissues and their interstices, and renders them permeable to water-soluble substances.

The nature of the diet has considerable influence upon the amount of water excreted by the kidneys. If an excessive protein

diet is used, a greater quantity of water should be drunk. This is because the nitrogen of the protein food is excreted in the urine in the form of urea, uric acid and other substances, and it involves less work upon the kidneys if these and other excretious substances be sufficiently diluted to prevent the irritation. On the contrary, a strictly vegetarian diet, containing but a small amount of nitro-genous food, requires less water. It is a clinical fact that a large proportion of cases of intestinal stasis is the result of wrong eating, in which an excess of meat was the principal factor of causation, and after the unphysiological changes have taken place at different areas along the digestive tract, notably in the colon, the internal use of a considerable amount of water is strongly indicated; and to pursue the subject still further if distortions, bends, folds, etc., approaching the possibility of kinks, are in evidence, making the area of infection more isolated and marked, the use of water to offset destructive action is again still more strongly indicated.

Hydrotherapy, because of promoting more than usual skin elimination becomes of great value in visceral stagnation.

Soiled clothing allowed to be immersed in ordinary cold (faucet) water will show more or less discoloration in the water when the clothing is removed from same. If the same process were repeated with hot water, on account of the expansion of the heat the effect would be more marked. If, again, under the same conditions, soap were added, the result would be increasingly noticed. And still further, if the hot water and soap were violently agitated, as for instance in the modern electric washing machine process, the maximum of efficiency would seem to have been reached in the cleansing process.

Likewise, a patient may have only a local infection of a fibrosis, but the general appearance from a facial expression to a general lassitude indicates a widespread toxic distribution. It is in this class of cases that its value is shown, and the above simile of clothes washing can to an extent be duplicated within

the human body by proper procedure and an assimilative water, which means a water devoid of as much as possible of chalybeate or other mineral content sufficient to hinder quick absorption in the tissues.

Poland Spring water, with which writer is very familiar, is an example, having but a minute quantity of mineral with a mild alkaline reaction. Such water when obtainable, if freely drunk and used for colonic irrigation, combined with the sine wave current technique as outlined for the treatment of ileal and colonic stasis, will certainly enhance the restoration process greatly.

Statistics tell us that only about 2 per cent. of stomach troubles are the result of stomach disease per se, but rather of the duodenum or furhter down the intestinal tract. Ordinary gastric lavage has no effect whatsoever on the duodenum, no more than colonic flushing would have on the ileum side of the ileocecal valve. Therefore, the usual methods employed for local stomach washing can not be instituted in the duodenum, jejunum or ileum.

Assuming that it is essential that the infected areas of the larger proportion of cases of intestinal poisoning should be thoroughly cleansed as a part of the treatment, as should be done in cases of naso-pharyngeal infection, the process to which the reader's attention is called seems to answer a question that has long been before the profession.

Various circumstances have an influence upon the rapidity of the aborption of water. The lower the degree of tension in the vascular system, the more rapid under otherwise like conditions will be the absorption of water into the bloodvessels. After considerable loss of fluids, as by diarrhea, hemmorrhage, profuse sweating, copious elimination of urine, or other normal or pathologic process, more rapid absorption of water from the intestinal tract will be observed. Water holding less saline matter in solution is more readily taken up into the blood stream than water containing much saline matter. Free alkali increases

considerably the attractive power of a fluid, especially for one with a feeble acid reaction. Thus, a fresh water rich in carbon dioxide, and deficient in saline matters, is likely to be most rapidly absorbed, and is particularly suitable as a beverage. Water containing saline matters is absorbed much more slowly, and will therefore cause a sense of pressure and fullness in the stomach, even when taken in small quantity.

Giving due credit to the institutions where hydro-therapy is the principal treatment, and admitting the great benefits to be derived therefrom in increasing metabolism, thereby relieving painful affections, much more may be done by the internal use of an assimilative water under proper technique. To make some crude comparison, let us imagine an ordinary parlor that is swept, dusted and washed sufficiently often to give the room an air of respectability and cleanliness, and yet back of the furniture and pictures there is the undisturbed, accumulated dirt and dust which is removed only at the annual or semi-annual cleaning, which to a certain extent is always a menance to the air passages, compared with the same room's having the dirt removed as thoroughly from the invisible as well as the visible areas, this would be comparing the healthy washing of the body and leaving areas of intestinal stasis to poison in ordinary accessible areas. Therefore, it is the author's intention to present to you the claim that an assimilative water, a water devoid of sufficient mineral matter so that it can be absorbed in large quantities, and then by process of agitation and exercise so that elimination of the waste products of the deeper tissues can be augmented, as in no other way, the kidneys and bowels could be made to do their own appointed share of work, less would be required of the skin, and the lungs and infections which cause so many diseased conditions could be prevented. This is not a fancy theory that is presented to the reader, for the writer has had opportunity for several years of using a water that is so pure that large quantities can be taken, with results which have been so pleasing that it is worthwhile to bring the subject to the reader's attention.

There may be other pure waters in the various regions where people live, besides, Poland water, which answers the purpose for illustration, as it is recognized as being devoid of objectionable substances, consequently readily taken up and absorbed.

The internal use of considerable quantities of water has only been touched upon in literature on the subject as might apply to drinking, colonic flushing, which is all right as far as it goes. From observations of hundreds of cases during the past fifteen years, during which the writer has given the subject of intestinal poisoning special study, he is thoroughly convinced that definite and scientific mechanical manipulation of the abdomen, after large quantities of water have been taken, enhances the beneficial action.

CHAPTER III

Inflammatory Exudates—Extravasations—Infiltrations and Indurations—Physical Treatment of Foot and Ankle Distortions—Hypertrophy of Prostate—Obesity.

INFLAMMATORY EXUDATES

The viscera of the various cavities of the body, cranial, spinal, thoracic, abdominal, and pelvic, as also muscles, tendons, and nerves, are enveloped in shut sacs, containing normally serous fluid sufficient for purposes of lubrication. The articular cavities are also lined with a serous membrane, providing a similar lubricating fluid for the joints.

In acute or chronic, primary or secondary inflammation of any of these serous sacs, an excess exudate occurs. In acute or chronic inflammatory disease of any of the organs, covered by serous sacs, these sacs may become involved with the same results,—an excess serous exudate.

Post-operative organized exudates are the result of trauma, in the course of surgical procedure, or the result of post-operative sepsis.

Post-acute inflammatory effusions, and the post-operative exudates, organized or unorganized, infected or sterile, play a most conspicuous role in the tragedy of disease and are most important factors in the production of chronic pathology.

Termination of acute disease by crisis favors rapid absorption of inflammatory products; termination by lysis favors chronicity and organization of these products.

Nature, in many of the cases of acute primary disease, is entirely adequate to the task of absorption of her serous effusions, but as often conspicuously fails; and, since a successful outcome of the unaided efforts of nature to remove the exudate can not be foretold, it is well to assume that she can not, and to proceed upon that assumption. It is here that galvanism and diathermy are oftentimes used, followed or combined with the sine wave current, with desirable results.

PHYSICAL TREATMENT OF FOOT AND ANKLE DISTORTIONS

The tone of the muscles varies widely, not only in different muscles at the same time but at different times and circumstances. Among the causes for this variation are: defective original development, different states of energy, and degrees of cause through injury and disuse of the muscles.

Anything that tends to impair muscle action in the region of the foot is likely to cause deformity, much or little. Flatfoot or any other malformation below the ankle, unless it is through injury, is of a mechanical nature.

It is essential that the muscular and ligamental structure about the foot and ankle, more than any other part of the body, be maintained at its highest point of efficiency.

Artificial support, when adopted or applied to a part for one reason or another, may be used as a temporary measure, when the foot is no longer able to perform and maintain its customary work.

As it is natural for the foot to have a flat surface to walk on, footwear should be made and adjusted accordingly, so that in walking the muscles that take part in that performance can have the best possible leverage.

The use of arch supporters, etc., constructed in the shoe, or removable or temporary strapping to relieve some part where the pressure is painful, is of necessity often resorted to, but the real cure of flat-foot and similar conditions described, is the training of the muscles responsible, so that they will regain the prehensile power of the foot.

The usual procedure by squeezing, pulling, twisting, and rotating the muscles of the foot, under the name of "massage," is efficient to a degree if long persisted in.

The use of the sine wave current preceded by galvanism or diathermy, lengthwise not crosswise, on the defective muscles and ligaments when adjusted to the normal action of the muscles of the part is, in the hands of those who are familiar with technique, a more satisfactory procedure.

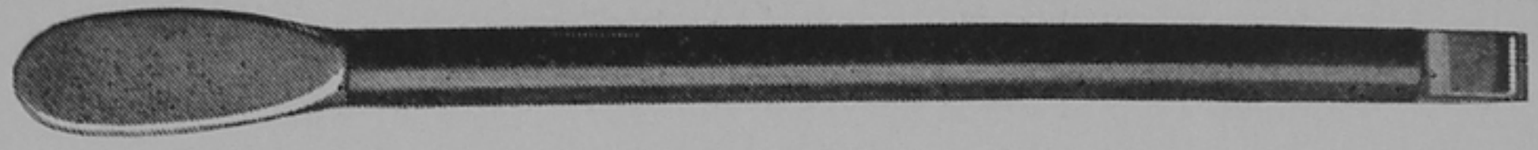
HYPERTROPHY OF THE PROSTATE

This is a condition that calls for careful discrimination in regard to whether it would be wise to treat the case or refuse to do so. A chronic prostatitis that has advanced to a stage where malignancy is probable would be aggravated by any form of treatment, and it is for surgery and radium to do their best and "hope they have discovered it in time." The usual form, however, simple hypertrophy in its chronic stage, can be greatly benefited, and surgery usually prevented by the use of wave currents—alternating—with or without the addition of diathermic applications preceding the wave current. The procedure is carried out in the same manner as the treatment of a prolapsed sigmoid, save that the large surface electrode should be across the lower abdomen and prostatic electrode be in perfect contact with the rectal aspect of the gland.

A hypertrophied prostate, where surgery is too often prescribed, can usually be relieved of the pressure symptoms of difficult, painful or frequent micturition or a combination of the

above, by applications sufficiently often to produce results, gradually extending the time between treatments as conditions improve.

Fig. 64.



Prostatic Electrode.

Fig. 64 shows a prostatic electrode, the treating surface having a concavity to conform to the prostate for alternating current.

Diathermy with a proper fitting prostatic electrode just preceding the sine wave alternating surging current is probably the most valuable procedure. There is no cavity application of electricity where the maintenance of perfect contact is more essential than in this class of cases, and it is here that the rectal electrode support, Fig. 28, or some similar device should be used.

It is unnecessary to state that in using the current as above outlined, the metal abdominal electrode must be changed for a large, moist, surface electrode, while the prostatic electrode may remain in situ.

OBESITY

There are many areas of impaired function that can not be described in the list of diseases; conditions that have no pathology but have a tendency toward that end if allowed to continue, that may be classed under the head of symptoms belonging to general or faulty metabolism.

Obesity, for example, may be treated by diet alone, and if strictly followed, other conditions being equal, is likely to produce results. Passive exercises, whether manual or mechanical, combined with hydrotherapy, or without, will often relieve patients of adipose tissue, but as a rule, will produce only temporary effect, unless in conjunction with proper diet. Unless continued for a long period, this has a tendency to exhaust the patient and his exchequer. On the other hand, with the average obese subject, when the rigid diet is no longer observed, the patient will usually relapse into his former condition.

It is here that selective mechanical motion, the alternating surging current, according to the physiological action of the part under treatment, is the best procedure. This is because the prominent feature of the manipulation is that one will be able to tolerate a greater amount of rhythmical impulse, administered in a way that would not be possible with any other physical method. Other areas will be described in several of the "Techniques."

A combination of mechanical gymnastics, properly administered, and the careful adherence to diet will almost invariably produce quicker and more lasting effects. Where diet and proper exercise are combined in treatment, wrinkles and other objectionable features are less likely to occur.

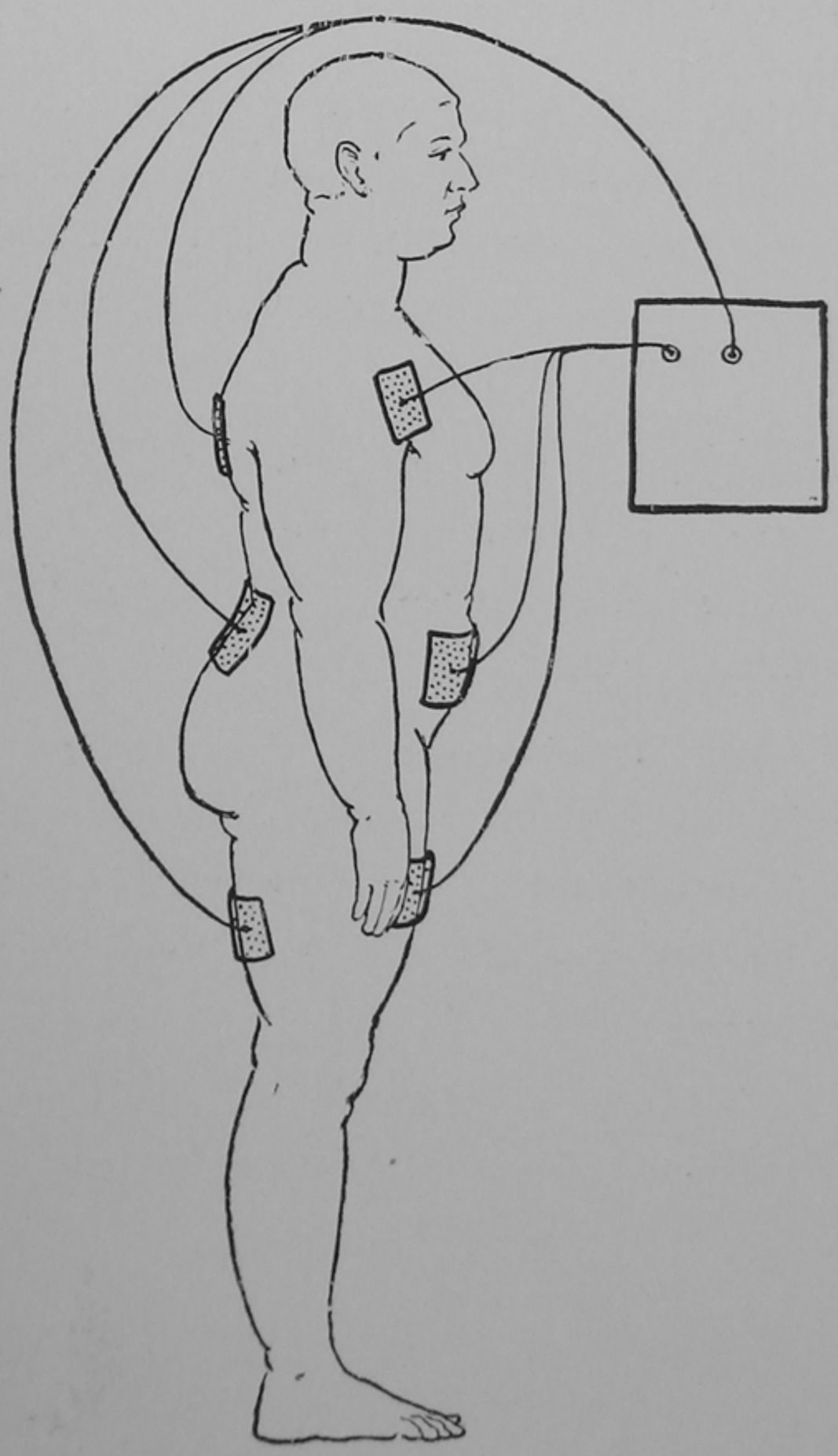
The probable explanation is that the equal period of rest and contraction gives the tissues a chance to recover and not become exhausted as would apply, for instance with an inter-

rupted galvanic or galvanic sinusoidal current. The latter are also objectionable because of the skin resistance, — burning sensation—which will be intolerable to the patient if the necessary forcible contractile effect is produced.

Small surface electrodes, using four or six at a time, could be utilized to advantage, not only in saving time, but that greater areas may be exposed to treatment at one time.

Fig. 65 represents how several pads may be used at one time in treatment of obesity, or otherwise, as one might desire.

Fig. 65.



CHAPTER IV

Relation of Epilepsy and Asthma to Intestinal Toxaemia.

EPILEPSY

Epilepsy is a name given to a condition which is characterized by convulsions. There are many diseases, especially of the heart and kidneys where epileptiform spasms simulate and approximate the so-called genuine epileptic convulsions. These are recognized as the direct effect of the existing toxaemia upon the spinal and cerebral nerve centers.

The disease epilepsy has its own special characteristics inasmuch as the manifestations are of a periodic nature, and range all the way from a slight disturbance, causing a mental aberration, to actual unconsciousness, accompanied by severe muscular contractions.

Whatever pathological changes may be detected in a post-mortem within the cerebrum and the medulla the patient has usually gone through life without the actual focal point in the etiology being discovered.

Several years ago Dr. Seaman S. Bainbridge, the well-known New York surgeon, called the attention of the writer to the hospital record of fourteen cases of epilepsy, in the various degrees which he had operated upon for intestinal stasis. Twelve of these, after one year, had not had a recurrence; the other two had improved. Since that time it is an almost univeral observation that epileptic subjects who have been successfully treated in a non-surgical manner, for their colonic toxaemia, have been relieved and many cases clinically cured.

It is understood, of course, that strict diet should accompany such a procedure. The pernicious and persistent use of bromides

in these cases so blunts reflex irritability that abdominal symptoms are often overshadowed because of the nature of exising manifestations.

It is hoped that the reader will not think that the author intends to convey the idea that intestinal toxaemia is the only cause of epilepsy, but it is certainly sufficiently common to warrant more credence than is usually given.

Epilepsy is a disease of such great importance that an X-ray examination by enema should always be made so that the foci of infection can be located and *definite* applications be applied pursuing the same technique as outlined for treating the caecum or sigmoid.

ASTHMA

Spasmodic asthma is due to a sudden contraction of the circular fibers, and consequent narrowing of the calibre of the bronchial tubes. It is influenced by climatic conditions, heart disease, so-called "indigestion," and is amenable only rarely to medical measures, only as the cause can be determined, as might be with accompanying bronchitis or a heart affection that might be relieved by appropriate remedies.

Asthma is one of the many conditions like hysteria and epilepsy due to reflex disturbance, where the spasm and nervous manifestations are the only things observed, and the resort to antispasmodics apparently the only thing to be done.

Enlarged prostate and intestinal toxaemia, with special reference to the sigmoid area, when relieved, has often shown a quick diminution of the spasmodic attack, and in proof of the assertion, the asthma returned just in proportion as the causes mentioned became active.

CHAPTER V

Cautions and Conclusions—Reactions following Physical Therapeutics—What Therapeutic Results may be Expected in the Treatment of Intestinal Toxaemia—Summary and Conclusion.

REACTIONS FOLLOWING PHYSICAL THERAPEUTICS

The average subject of intestinal toxaemia that physicians attempt to treat by methods outlined for constipation must be carefully watched at first, for fear of temporary disturbance.

The common practice is that of treating intestinal toxic areas first by diathermy, followed by the surging alternating current through the part. The toxemia thus liberated, if not in a reasonable time eliminated, produces a reaction in the form of headaches, general malaise, and even a temporary arthritis may ensue.

Let it be impressed upon those who have not observed these deleterious effects, or who are just commencing to use apparatus of the nature that would be employed for such conditions, that the first few treatments should be administered in such a manner that the patient will not be locally or constitutionally disturbed, to prevent not only discouragement of the patient, but bringing discredit upon a method, where a better understanding would avoid the necessity of explanation.

It is on the principle by which purulent areas are corrected by the surgeon by effective drainage, that intestinal toxins, especially about the caecum, should be carried away in the bowel contents, and not be set free and allowed to be re-absorbed.

To avoid the reaction mentioned, it is better to apply treatment for intestinal toxaemia twice a week, instead of three to five times a week—a common practice—thus giving the emunctories a proper time for elimination of the poisons set free.

WHAT THERAPEUTIC RESULTS MAY BE EXPECTED IN THE TREATMENT OF INTESTINAL TOXAEMIA

Not every surgical operation, medicinal administration, or physical and electrical application is productive of the results the patient expects and the doctor hopes for. All the way from amelioration of the symptoms to complete relief and restoration of function and the prolongation of life, is the object to be attained in the treatment of disordered functions and diseased conditions. This will be brought about just in proportion to the physician's ability to correctly diagnose, and his familiarity and knowledge of implements available for consummation of the object in view.

As previously stated, the resistance, age, and chronicity of the existing conditions must necessarily determine the length of time needed to produce a sufficient change in the tissues involved to restore impaired muscular tone. Subjects with firm abdominal walls, though the colonic angles be sharply defined, will respond more quickly than a similar intestinal condition with abdominal walls that are thin and less responsive to passive stimulation.

The average subject of constipation will usually respond more quickly if the rectal electrode is used as outlined elsewhere, than if the patient is treated by the common method through the body. Therefore, the prognosis in a case of intestinal stasis must depend upon the factors mentioned, also, the faithfulness of the patient.

A prolapsed stomach and colon, with the usual distortions at the flexures will not be anatomically restored, but if the motility of the muscalature of the intestines is improved and the function is restored physiologically, the patient can be considered clinically cured, if not anatomically replaced.

When one considers the disastrous effect of continuing cathartics, and the inability of other forms of medicine or surgery to

restore defective muscular action of the involuntary fibre, one should be contented, even should it be deemed advisable to return again and again for treatment, realizing that neglected areas of distorted physiological function have a strong tendency to become pathological regions that soon become beyond repair, where surgery is often attempted but disappointing in its result.

It is best that patients having a prolapsed and distorted colon, which of necessity requires a considerable time to bring about results, should be informed of that fact when treatments are first instituted, lest they receive the impression that they are to be "cured" in a short time, lose confidence, and question the capabilities of the physician.

It is not necessary to state that a radiograph of the colon taken before and after a reasonable number of treatments is the real scientific procedure to determine results regardless of the patient's statement.

IN CONCLUSION

The writer does not wish to leave the impression that just because so much has been written in this volume on the treatment of gastro-intestinal conditions that may be considered physiologically abnormal, the rhythmic wave impulse therapeutics as outlined under the term "sine wave current" can not be utilized elsewhere about the body. It has become a common practice among many physicians as an almost routine procedure to combine diathermy with the mechanical action of a modern apparatus, in an innumerable class of sub-acute and chronic maladies. With selective motion now obtainable by apparatus, physical therapy has become so generally adopted that massage and manual manipulation is thus being superceded.

By application of the principles, and a thorough knowledge of the mechanism, one can materially increase his therapeutic efficiency.

SUMMARY OF THE GALVANIC CURRENT

I. The galvanic current has two practical fields of usefulness; *a*, when waveless, and, *b*, when in waves.

II. The waveless galvanic current has a broad use in medical applications because of the production of stimulating chemical interchanges in a local part as a substitute for diathermy or in association with it; it is particularly useful in diffusing drugs into a part immediately below the appropriate pole; it diffuses sterilizing ions into infected mucous or abscess packets; arrests uterine hemorrhage; and when used in massive dose will destroy local malignancies.

III. The galvanic wave is chiefly valuable in the diagnosis of the results of injuries and disease of the motor mechanism.

IV. Galvanosurgery has a useful field in the destruction of accessible cysts and tubercular deposits; the removal of small skin growths; and the sterilization and healing of sinuses.

V. For the relief of pain and congestion it is the most dependable of all physical or electrical methods.

In a volume of this size, having for its object to teach principals rather than Physical Therapy prescription writing only, a comparatively few Therapeutic indications are mentioned.

Sufficient has been said so that even the novitiate may grasp the idea that the Galvanic Current has very definite properties, which when understood and appreciated, may be used with great benefit.

The Positive Pole should be applied on or about the painful or congested area for relief and on the other hand, the Negative would be the active Pole where congestion is desired for its nutritional or solvent action.

As for instance in a case of Facial Neuritis, Lumbago, Sciatica, or Cerebral congestion, the positive Electrode would be applied on or near the painful part and the Negative on the Solar Plexus, Abdomen, Ankle or some distant point, the strength of current to be determined by resistance in circuit.

If pathological conditions are reversed as in Facial Paralysis, Infantile Paralysis, Locomotor Ataxia and similar areas where the essential element is to restore nutrition, then the Nagative would be the Active Pole.

It is here that the unidirectional Galvanic Wave Surging Current can be used to great advantage.

The same principal applies throughout the body as regards not only local polar effect but interstitial as well.

SUMMARY OF SINE WAVE CURRENTS

I. Sine currents have by clinical evidence proven their efficiency in advanced therapeutics as a separate and distinct combined electrical and physical method, along with high frequency current and the various light effects.

II. The principle that any action, either heat or mechanical or combined, will produce a more pronounced liberation of toxins, giving nature a quicker response toward return of function than previous methods.

III. Clearly indicated and honest surgery must be respected, including gastric or duodenal ulcer, presence of gall bladder or nephritic calculi, salphinitis or other internal purulent areas, abdominal cysts, fixed visceral adhesions, etc., also acute inflammation generally.

IV. Following traumatism surgery or local disease, when nature in her attempt at rejuvenation fails entirely or only partially to bring about relief of impaired function of a part, sine wave currents as outlined in this book will, when intelligently used, prove a valuable adjunct to other remedial measures.

V. The interpretation in the minds of physicians just what a sine current is and definite indications for use has only recently been made clear in literature on the subject.

For anyone who has taken the trouble to study the fundamentals, the galvanic current, because of its definiteness of action, has not been difficult to understand; and for those, it is obvious why a wave current, from a galvanic source, it is obvious why a wave current, from a galvanic source, should be uni-directional in character to maintain the important element, namely—Polar action.

A rapidly alternating sinusoidal current constructed so as to harmonize with cellular impulses, so rapid that any polarity action can not be detected, plus selective motion to correspond to physiological action of a part, removes the element of empiricism to a large degree.

VI. The importance of localizing in imperfect bowel elimination of the toxic regions and abdominal colonic flexures before instituting physical treatment, as one would outline a surgical operation, can hardly be overestimated.

The strong tendency towards malignancy in neglected intestinal stasis behooves the physician to always anticipate the possibility in the older subjects. The percentage of mortality from cancer of the sigmoid above is sufficiently large to substantiate it.

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LOW VOLT CURRENTS OF PHYSIOTHERAPY

FREDERICK H. MORSE, M.D.

Low Volt Currents of Physiotherapy

Physics · Effects

Technic

BY

Frederick H. Morse, M.D.

PUBLISHED BY

GENERAL X-RAY COMPANY

831 PARK SQUARE BUILDING

BOSTON, MASS.

Copyright, 1925
General X-Ray Company
Boston, Mass.

PRINTED IN U.S.A.

Preface

THE following pages are offered to the medical profession as a guide and assistant in acquiring a fundamental knowledge of the physics and effects of the Low Volt Currents of Physiotherapy.

They contain suggested technic for the use of low volt currents in various pathologies, offering suggestions for bases of procedure in treatment thereof. This general technic, developed by a number of foremost students of the subject — physicians and surgeons employing the Sine Wave or Sinusoidal, Pulsating Direct and Galvanic Currents — may be used to great advantage as an adjuvant to the practice of medicine and surgery.

My friendship and association with G. Betton Massey, M.D., Norman E. Titus, M.D., and Curran Pope, M.D., have been of much value in preparing these pages and to them I acknowledge my indebtedness.

Thanks are also extended to the authors of the following excellent works:

Physiotherapy Technic — By C. M. Sampson, M.D.

Practical Electro-Therapeutics and Diathermy
By G. Betton Massey, M.D.

Handbook of Electro-Therapy
By Burton B. Grover, M.D.

Essentials of Medical Electricity
By Elkin P. Cumberbatch, M.A., B.M., B.Ch. (Oxon), M.R.C.P.

FREDERICK H. MORSE, M.D.

Physics

ELECTRICITY may be described as the manifestation of a natural force developed by disarrangement of electronic equilibrium due to the influence of chemical action, magnetism or friction.

To easily understand the therapeutics of the Sine Wave, the Pulsating Direct and the Galvanic Currents, one needs but to review his physics to determine the action or effects which these forces, mechanical, physical and chemical, would have when applied to human tissue.

We will not attempt, in these pages, to describe the various apparatus invented and manufactured to produce the low volt currents, used for therapeutic purposes, but will define the terms with which the physician must become familiar, and describe the methods by which current flow or dosage is measured, also the electrical laws governing such measurement. We will also describe the character of each low volt current, as determined by years of study on the part of leading medical authorities, students of electro-physiotherapy, and thousands of users in everyday practice to be best adapted to therapeutic use. Likewise we will discuss the current required to correctly produce mechanical, physical and chemical effects when applied to aid nature in restoring normal function to unhealthy organism.

Definition and Terminology

Current of Electricity

Current is a flow of unseen force created by electronic rearrangement of matter.

The Volt, the Ampere, the Ohm

The pressure and flow of electricity are measured by units as follows:

The Volt.....Unit of Pressure
The Ampere.....Unit of Quantity
The Ohm.....Unit of Resistance

Obviously a definite voltage or pressure is required to force a definite milliamperage or volume through any part of the body offering a definite resistance.

Hence, we describe what is known as Ohm's law as follows:

Resistance × quantity = Pressure, or
Pressure ÷ resistance = Quantity, or
Pressure ÷ quantity = Resistance

Reduced to electrical terms it reads:

Resistance in Ohms (R) × Amperes (A) = Volts (V), or
Volts (V) ÷ Resistance in Ohms (R) = Amperes (A), or
Volts (V) ÷ Amperes (A) = Resistance in Ohms (R)

Reduced to algebraic formula it reads:

$$R \times A = V, \text{ or}$$
$$\frac{V}{R} = A, \text{ or}$$
$$\frac{V}{A} = R$$

To clearly understand Ohm's law is essential if one is to comprehend the meaning and value of the energy he is utilizing as indicated by the voltmeter, milliamperemeter and sine wave indicator. Each of these indicators is essential on every unit of sine wave and galvanic apparatus in order that the energy administered to the patient may be as carefully and correctly measured as drugs would be when weighed on delicate prescription scales.

The knowledge of Ohm's law also impresses the physician using electricity with the value of the resistance existing between two electrodes when placed in contact with a body by which the circuit is completed and through which the current passes.

However, in the application of low volt currents for therapeutic purposes, although we apply Ohm's law in principle, we do not use the law itself as a means of measuring dosage. The reason for this is that the physician has no practical means of measuring the resistance of various parts of the body in ohms; nor would it be necessary for him to do so even if he had the means, as we are concerned with three factors only, as follows:

1st: Character of the current being used
2nd: Volume of current being used
3rd: Pressure of current being used

Low Volt Currents Defined

Low volt currents of light and power circuits range from 1 to 50 volts. The standard useful voltage of a light or power circuit is from 100 to 500 volts.

There are four types of electrical apparatus used in medical practice as follows:

1st: Apparatus to produce Sine Wave, Pulsating Direct and Galvanic Currents ranging from 1 to 250 volts.

2nd: High frequency apparatus producing currents of from 5,000 to 50,000 volts.

3rd: X-Ray apparatus carrying from 10,000 to 300,000 volts.

4th: Static apparatus developing up to 1,000,000 volts.

Hence, the Sine Wave, Pulsating Direct and Galvanic are known as the "LOW VOLT" CURRENTS OF PHYSIOTHERAPY.

Direct Current Defined

A direct current of electricity is one which flows in one direction continuously. It is commonly indicated by the abbreviation D. C.

Polarity Defined

The direction of flow of the direct current is indicated by the signs + and —, the current flowing from positive (+) to negative (—) poles. This determines the "polarity" of the current at each of the two electrodes in contact with the body.

Alternating Current Defined

An alternating current is one which flows for a short period of time in one direction, then in the opposite direction for an equal period of time (alternating direction of flow). It is commonly indicated by the abbreviation A. C.

The Cycle Defined

One complete cycle of an alternating current is diagrammatically described by a curve projecting from a horizontal line representing the zero point of no voltage, scribing an arc rising to maximum or peak just above or below the line representing one direction of flow followed by a similar arc in the opposite direction representing the opposite direction of flow. See solid black arcs in Figure 1, representing one cycle.

Frequency Defined

In an alternating current double the number of cycles occurring each second or minute is called its frequency. The ordinary A. C. lighting circuit has a frequency of 60 cycles per second. The frequency of the alternating current delivered by the "Morse" Wave Generator is 180 cycles per second. This provides 10,800 cycles or 21,600 alternations or impulses per minute.

Engineers and designers of the "Morse" Wave Generator, in collaboration with the medical profession, have spent years experimenting and testing in order to determine accurately the proper frequency of current to produce the maximum of penetration and contraction with the minimum of tetany. They have found 10,800 cycles per minute to be high enough to produce the required penetration and contraction of muscle tissue with a smooth, agreeable sensation of current, and not so high that motor nerves controlling contraction could fail to respond.

The "Sine Wave" or True Rapid Sinusoidal Current

The (Alternating) true rapid sinusoidal or Sine Wave Current has no polarity as it reverses its direction so rapidly that each alternation neutralizes the effect of the previous one, except in the case of the Galvanic Sinusoidal.

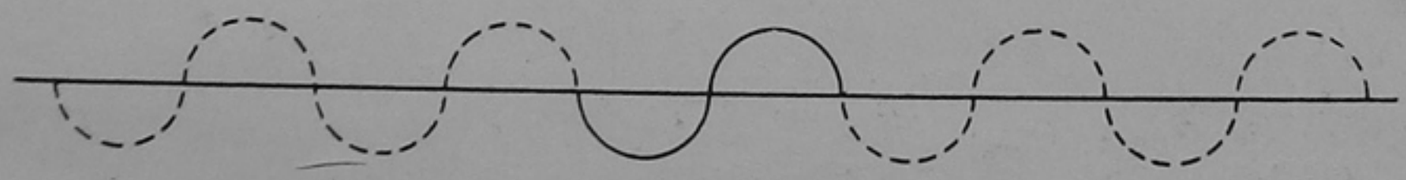


Figure 1

Any true alternating current, one wave of which approximates a sine curve in character, is called, in medical electricity, the sinusoidal current.

The "GALVANIC SINUSOIDAL" CURRENT has polarity for the period of each surge. It is characterized as a slow-surging, reversing, direct current and flows in one direction for a sufficient period of time to produce polar

effects before reversing its direction, such as a burning sensation and irritation of the skin under the surface electrodes when sufficient current is being used to produce deep muscle contractions. The current, in reversing, produces opposite polar effects, neutralizing previous effects, and is accomplished by mechanical means, such as brushes moving over a resistance, or auxiliary brushes caused to move to and fro over the commutator bars collecting current from the D. C. generator.

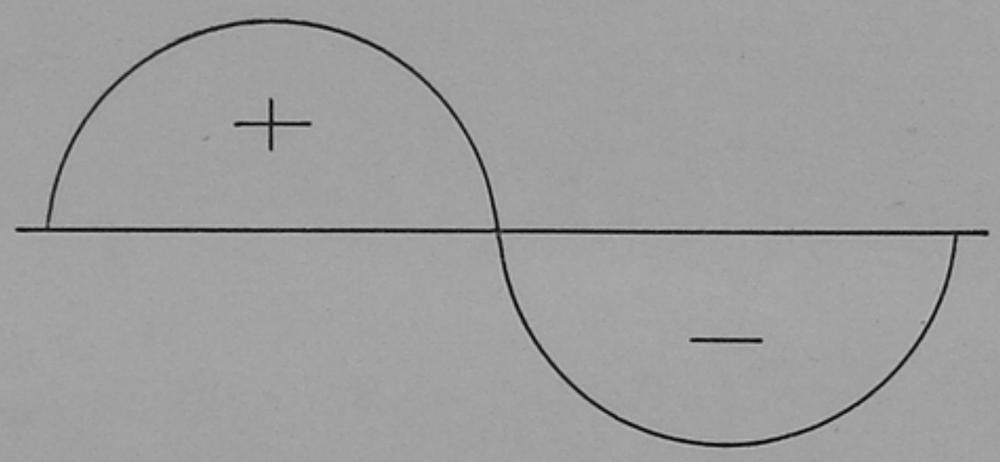


Figure 2. Galvanic Sinusoidal Current

It has long been an accepted fact that for muscle exercise, or for any condition or reason whereby contraction of muscle tissue is required, there is one specific current which is correct. This is the RAPID CYCLE

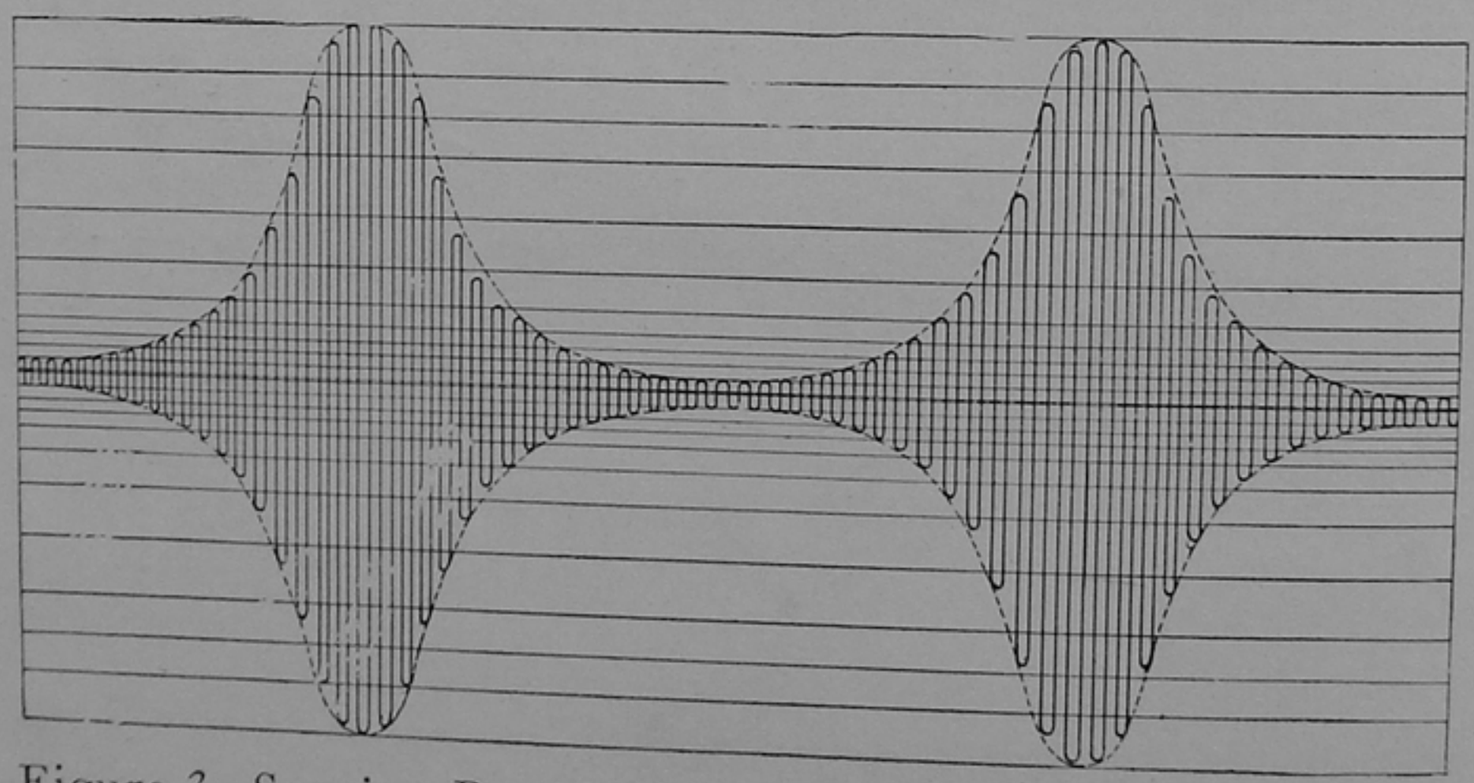


Figure 3. Surging Rapid Sinusoidal or Sine Wave Current

ALTERNATING CURRENT carrying not over 11,000 and not less than 10,000 cycles per minute, and by the use of cams caused to surge with such periods of contraction and rest as may be required by the muscles under treatment. The following reasons for this are given:

1st: Rapid alternation prevents burning and skin irritation under the surface electrodes.

2nd: The muscles at both electrodes and those at all points between them are caused to contract with as great a degree of uniformity as their susceptibility to the same current strength will allow.

On the other hand, when the galvanic sinusoidal current is used to exercise muscle tissue, all the muscle contraction is produced directly at the poles, or points of contact, alternately. One surge produces the contraction at one point, and the following surge at the opposite point. There is little if any contraction caused to the muscles lying halfway between the electrodes, depending on the distance and the resistance encountered.

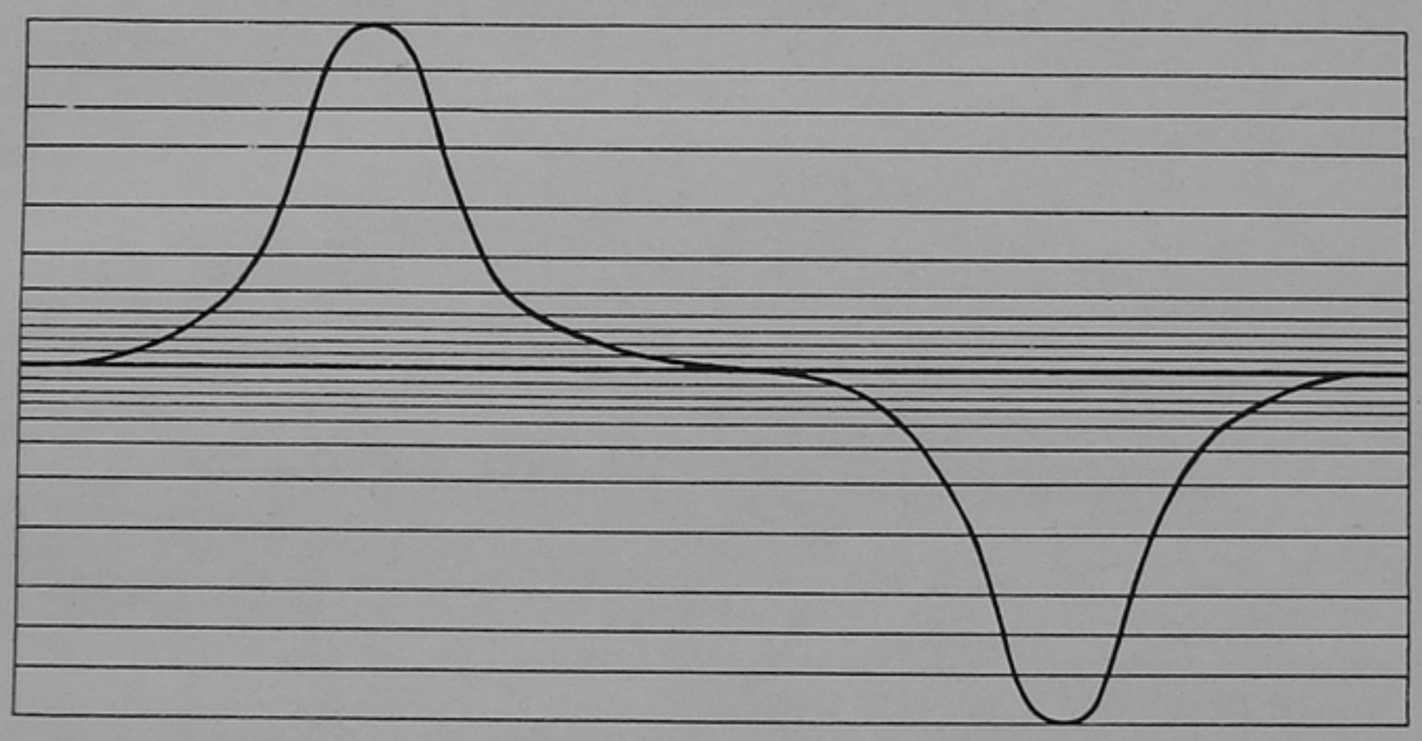


Figure 4. True Sinusoidal Currents may vary in character as illustrated above

Low Volt Currents Divided into Three Groups

A universal desire for standardization on the part of the medical profession has led to the simplification of terms used to describe low volt currents, and has aided tremendously in STANDARDIZING TECHNIC. By this means much useless combining of currents has been eliminated, as has also the use of coined names, which have no meaning and in no way describe the current they represent.

Low volt currents used for therapeutic purposes are now classified in three groups, and bear the same names as currents of the same general character in the scientific electrical field.

Group No. 1

The Non-Surging Sine Wave Current
The Surging Sine Wave Current

Group No. 2

The Non-Surging Pulsating Direct Current
The Surging Pulsating Direct Current
The Interrupted Pulsating Direct Current

Group No. 3

The Non-Surging Galvanic Current
The Surging Galvanic Current
The Interrupted Galvanic Current

Surge Defined

The surge of the low volt currents, as used for therapeutic purposes, may be defined as a slow, gradual rise and fall of current strength, produced by mechanical means, and causing periodical contractions of muscle tissue with intervening periods of rest.

Selective Motion Cams of the "Morse" Wave Generator

The seven distinct surges described on the following pages are caused by the use of cams designed to produce a smooth, gradual increase and decrease of current at definite periods, with definite intervals of rest between. The period and character of the surges and consequent muscle contractions are governed by the shape of the cam designated for the work in hand.

No matter whether the Sine Wave, the Pulsating Direct or the constant Galvanic Current is being used, the actual character and frequency of the surges are the same. To illustrate both the character and frequency diagrammatically, which can be clearly visualized, the constant Galvanic Current has been charted.

The great advantage derived from the use of cams for producing the required surges is that by introducing a variety of shapes we can control not only the speed and length of the surge but its character as well. For example: the use of Cam No. 3 causes a gradual increase of voltage to maximum with a corresponding decrease to minimum and equal periods of rest. Cam No. 4 gives exactly the same number of surges per minute as Cam No. 3, but it will be noticed that by altering the shape of this cam, we have caused a more abrupt increase and decrease of the current than produced by Cam No. 3, we have increased the length of time during which it remains at maximum voltage.

Figure 5 is a chart on which a curve has been scribed indicating the increase of current strength from minimum to maximum and at relative positions of the sine wave indicator. (Non-surging currents.)

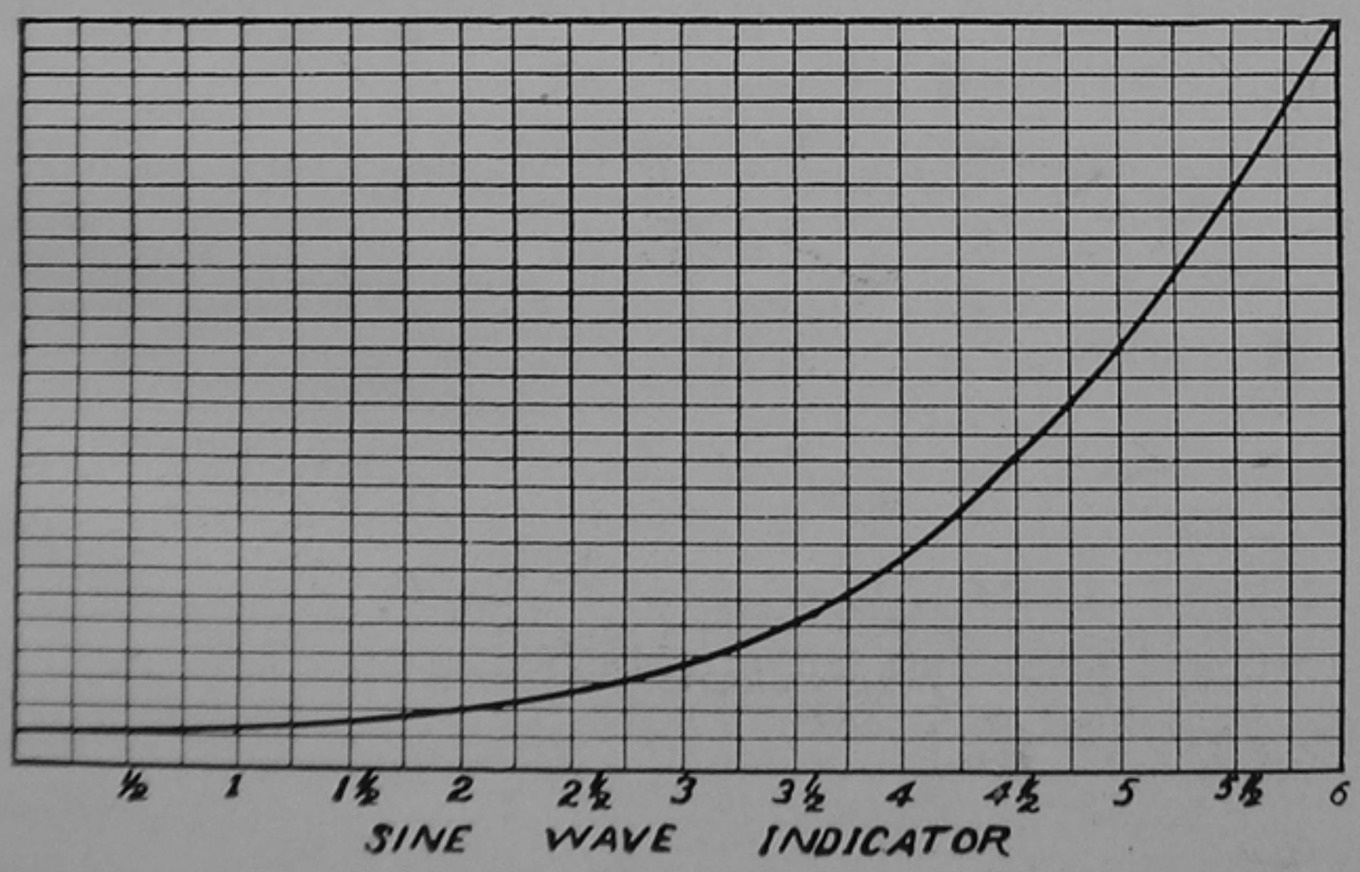


Figure 5

Cam No. 1

Or Lever Lock Producing Non-Surging Current

The non-surging currents are produced by locking the control lever mechanism or by the use of round Cam No. 1, on Generators provided with this cam. This causes a gradual increase of current strength, as the control lever is moved from left to right, or minimum to maximum without surge. (Non-surging currents.)

This non-surging current is particularly useful in muscular weakness, especially weakness of the extremities. It is also useful for improving local metabolism and restoring tone to the parts and for all other purposes where a constant voltage Sine Wave, Pulsating Direct and Galvanic Current is indicated.

Surging Currents

In charting the following current surges, great care has been taken to correctly scribe the character of surge developed at the various levels of current strength. This variance depends on the position of the control lever, which increases and decreases the strength of current being used.

The lateral lines, to which peaks of surges are drawn, illustrate how the increase and decrease of strength change the character of all surging currents, regardless of how the surges may be produced or the type of apparatus being used. This variance in the character of the surge will take place at different voltages where there is no change being made in frequency of surges. This point is brought out merely to explain the reason for a variation in the character of the surges, as sketched in the very excellent works on low volt currents written by well-known authorities on the subject.

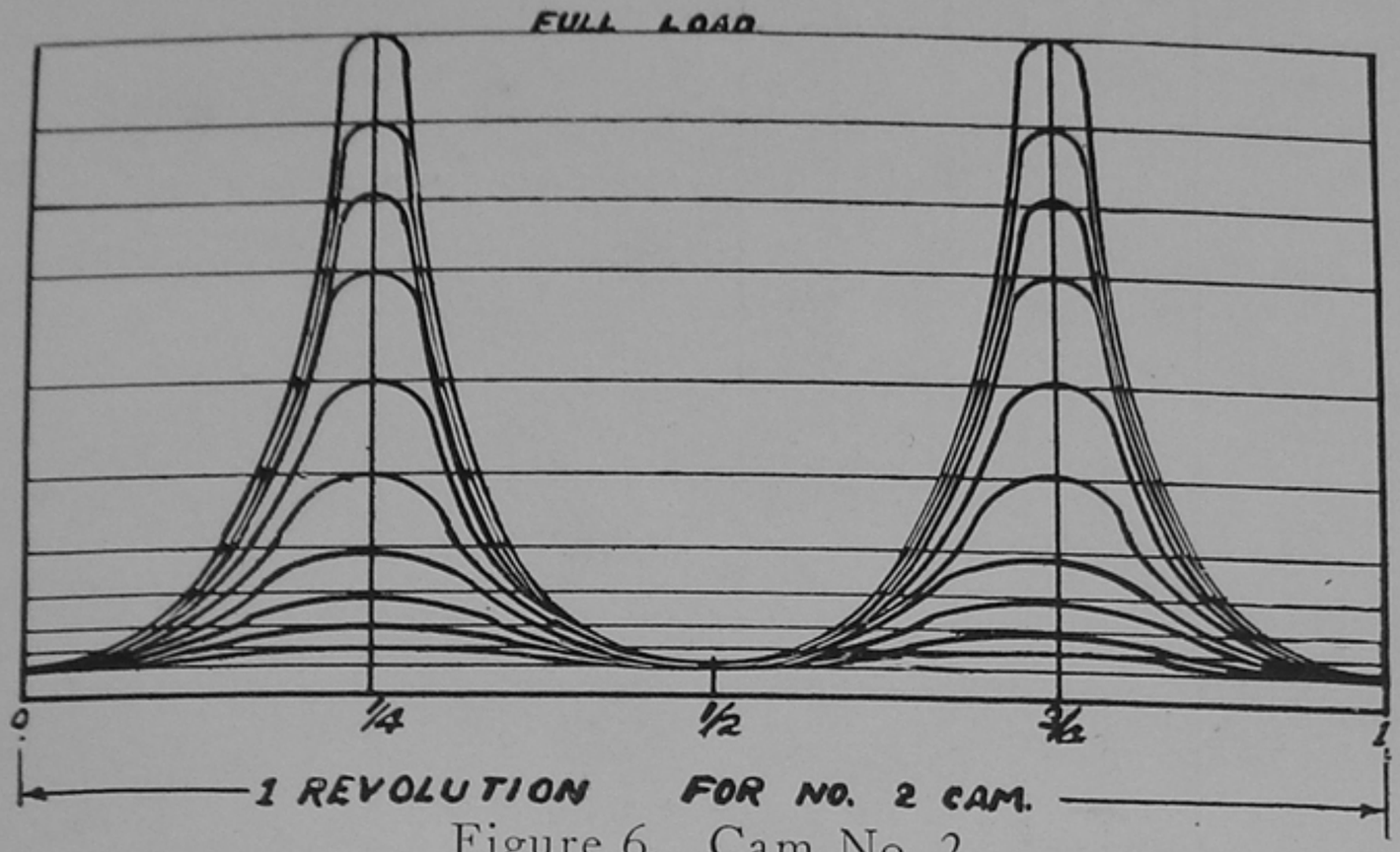


Figure 6. Cam No. 2

Cam No. 2 produces twenty-two surges per minute, with equal periods of rest.

Cam No. 3 produces eleven surges per minute, and is so constructed that the rise to maximum voltage or peak of the surge and fall to minimum is extremely gradual, while the intervening period of rest between surges is prolonged. Diagram, page 16.

Cam No. 4 produces a surge with abrupt rise of current strength, prolonged at the peak of the surge, followed by abrupt diminution with equal period of rest between surges. Diagram, page 17.

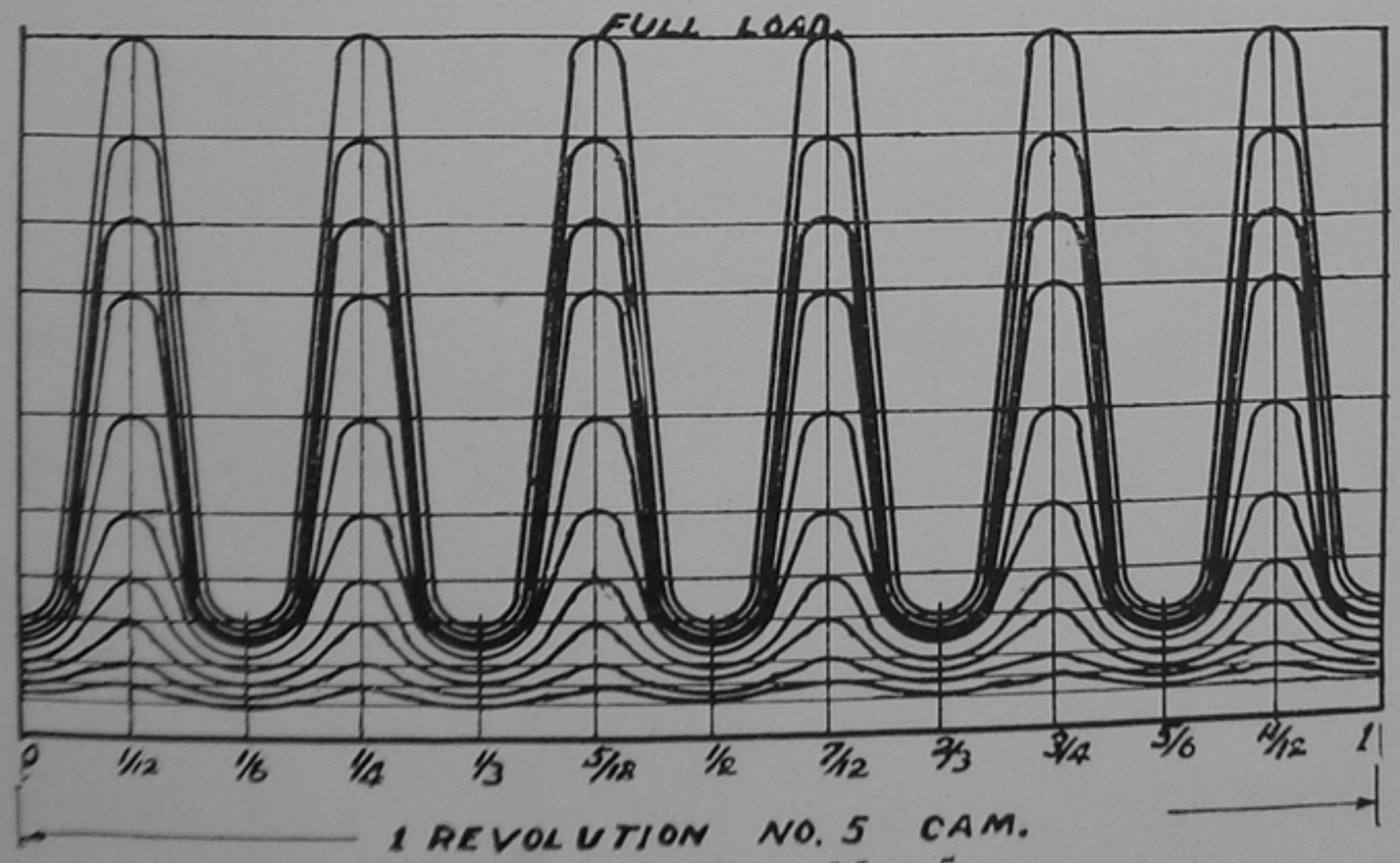


Figure 9. Cam No. 5

Cam No. 5 produces sixty-six surges per minute.

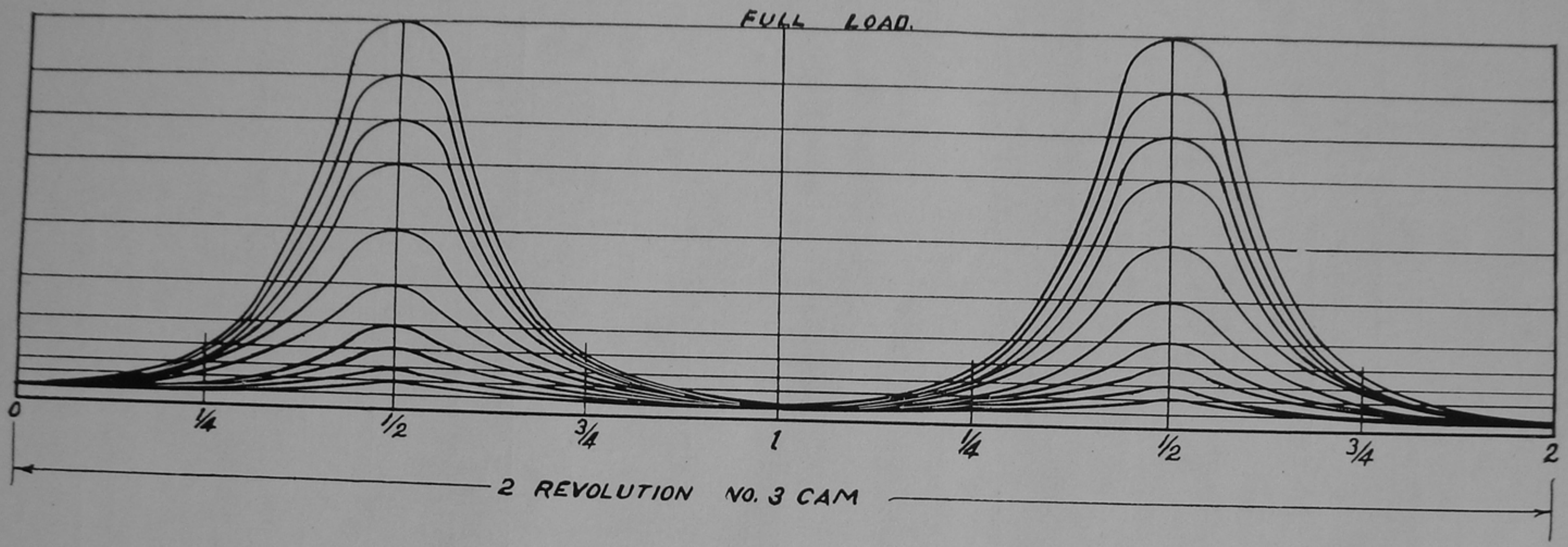


Figure 7. Cam No. 3

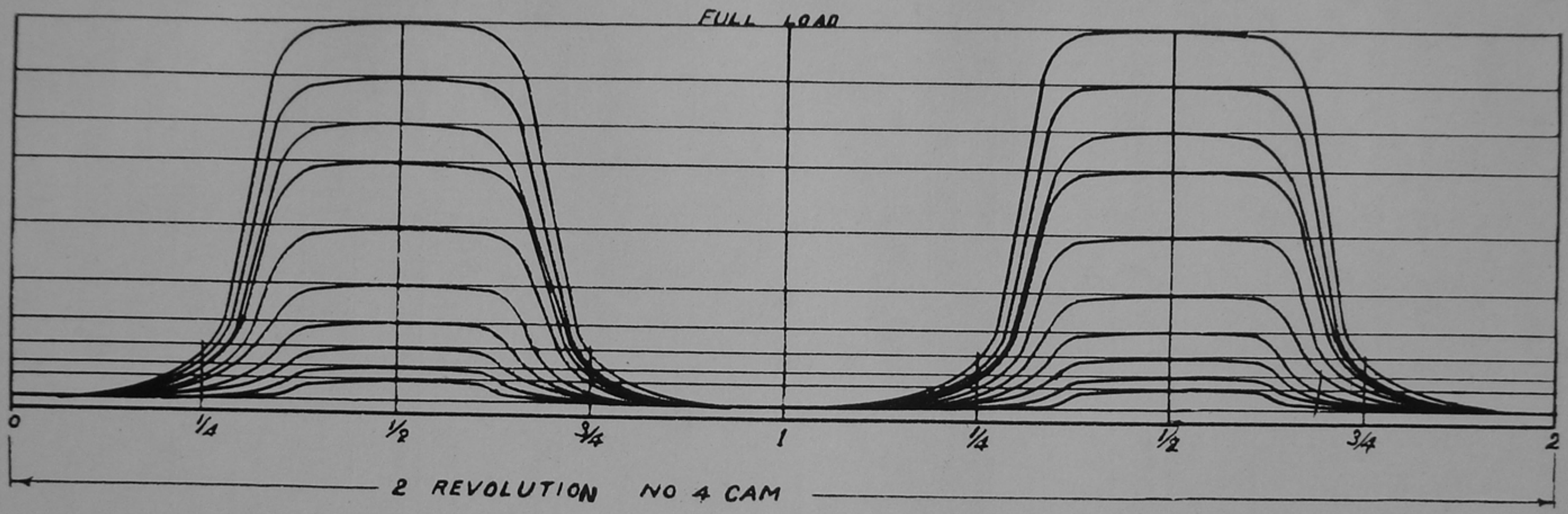


Figure 8. Cam No. 4

Cams Nos. 6, 7 and 8

The indications for use of Cams Nos. 6, 7 and 8 are necessarily variable, depending on the rapidity of surge or muscle contraction desired for treating pathology of cases at hand.

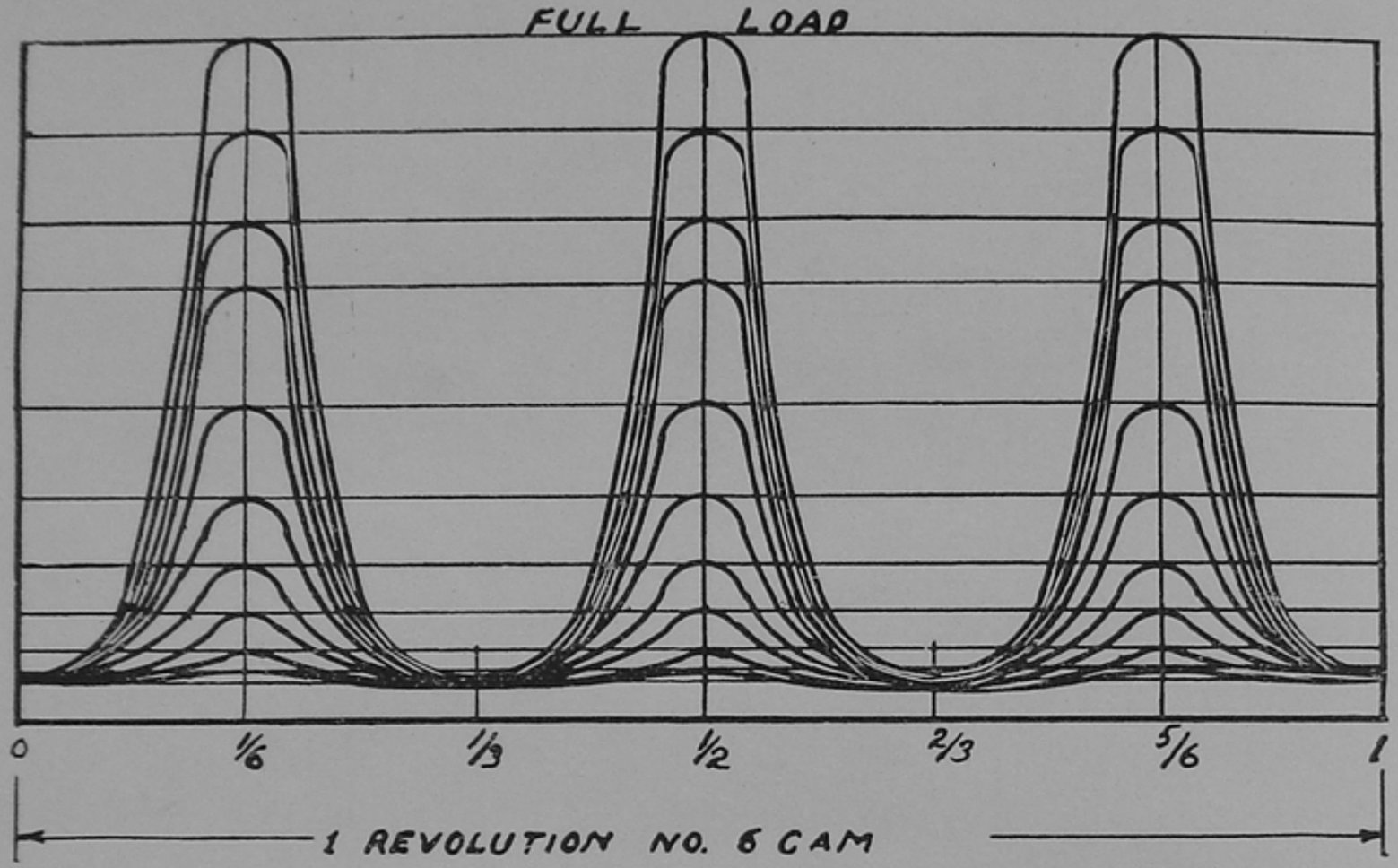


Figure 10. Cam No. 6

Cam No. 6 produces thirty-three surges per minute.

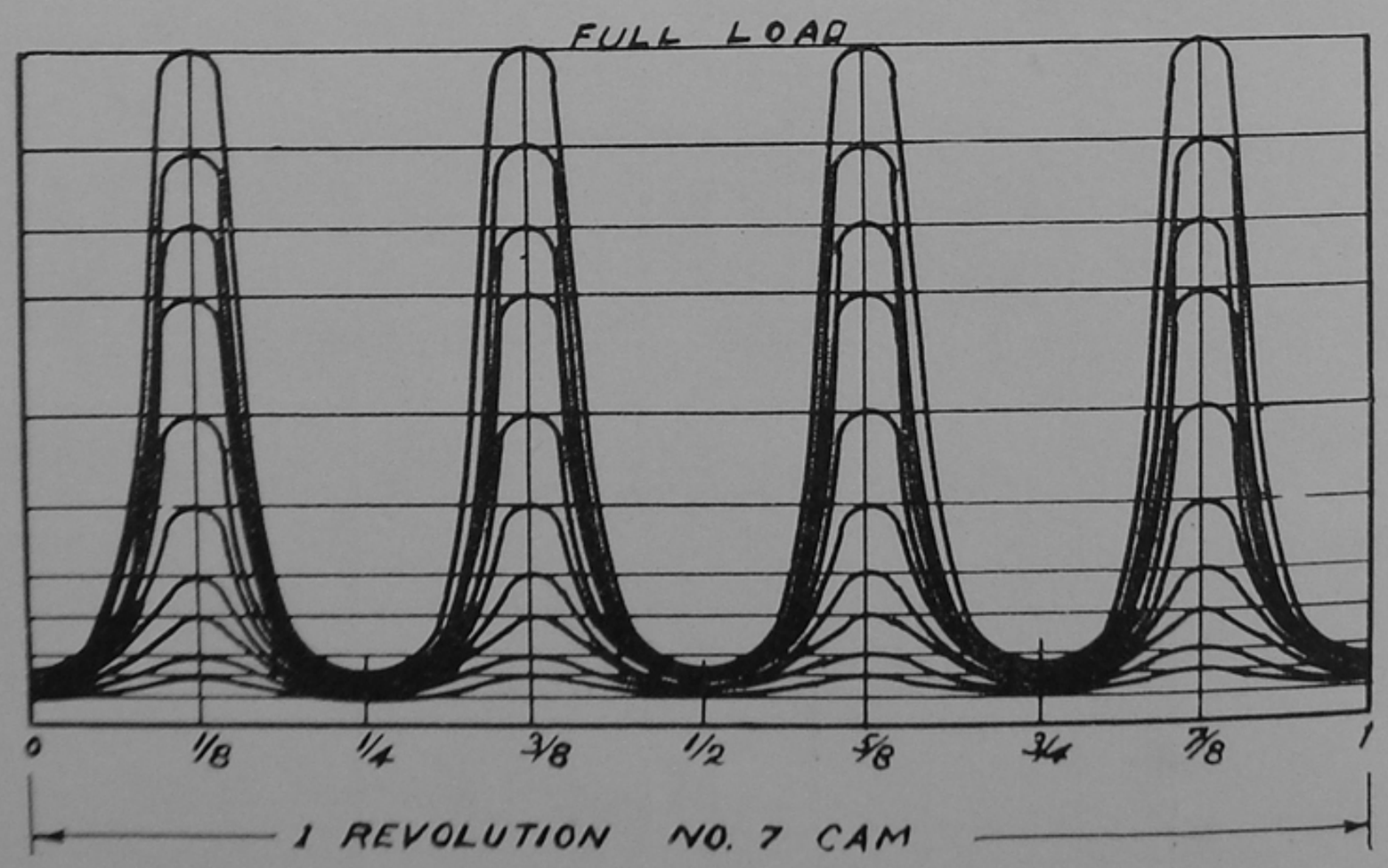


Figure 11. Cam No. 7

Cam No. 7 produces forty-four surges per minute.

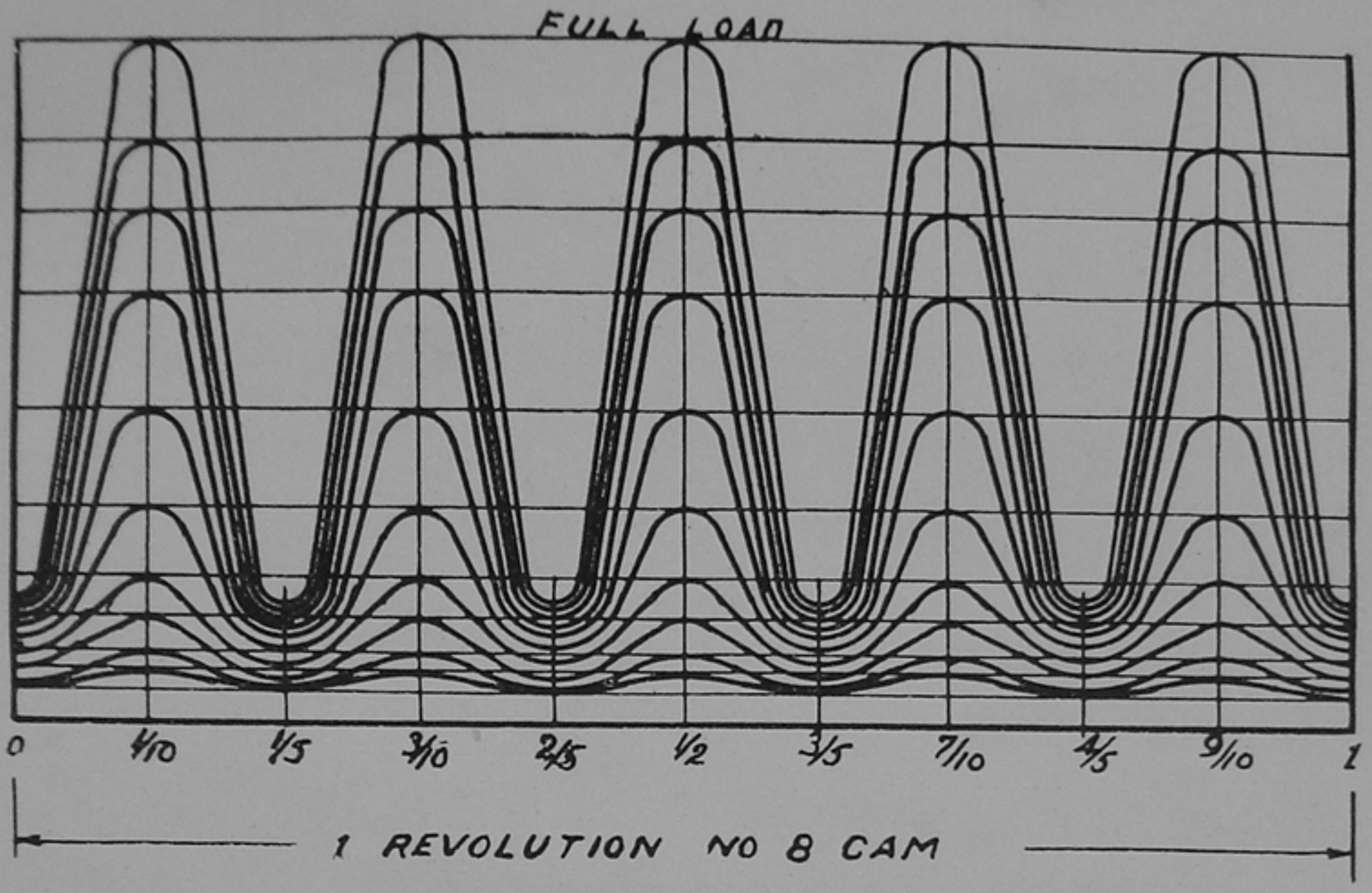


Figure 12. Cam No. 8

Cam No. 8 produces fifty-five surges per minute. Muscles are the immediate sources of energy by which the various parts of the body are voluntarily or involuntarily moved. These muscles or groups of muscles normally contract and relax at varying periods. The different current surges, also the desired muscle contractions resulting from their use, as above described, have been carefully studied, and selected motion cams of the "Morse" Wave Generator designed to imitate normal muscle action without causing fatigue. The different surges, produced by these seven cams, imitate all of the muscle action of the human body commonly requiring restoration of function.

Effects

Mechanical, Physical and Chemical

The next step in studying the therapeutics of low volt currents is to acquire a knowledge of the various EFFECTS produced by these currents. This will enable the physician to select the proper current indicated for treatment of the case in hand, and produce the desired result.

The therapeutic use of electricity comprises those applications of electric power transformed into mechanical, physical or chemical action, as may be employed for the correction of diseased conditions. One cannot too strongly emphasize the fact that in the treatment of physical affections particularly, electricity is employed exactly as it is for industrial uses, merely carries power which is transformed into some other form of force within the structure into which it passes. In therapeutic use it is transformed into mechanical, physical or chemical action, and it is this resultant force which is actually employed as a medical or surgical instrumentality. One should not think alone of the agency by which this force is carried into the body, but rather of the EFFECTS which it produces when passing through.

Effects produced by the Alternating (Sine Wave), Pulsating Direct and Galvanic Currents may be divided into three groups, mechanical, physical and chemical.

Mechanical Effects

Mechanical effects produced by low volt currents are those associated with involuntary muscle movements which are produced by the Sine Wave, or "Sinusoidal" Currents.

At this time, let us carefully consider the meaning of the word "sinusoidal," as applied to physical therapeutics.

First, a true sinusoidal current is an alternating current, the wave or alternation of which approximates in character, the sine curve. These alternations may be either very rapid or very slow. The latter condition occurs where a direct current is generated, then caused to slowly surge in opposite directions. This may be accomplished by means of a mechanical surging device, operating resistance in circuit with the patient, or by means of one which causes auxiliary brushes on the generator to move to and fro over the commutator bars.

In the early years of Physiotherapy, this reversing direct current just referred to was called the "Sinusoidal" current.

To clearly differentiate between the reversing direct current and the surging rapid alternating current, both of which are sinusoidal, our best authorities on the subject have called the latter the "SINE WAVE CURRENT."

This distinction has been very ably described by no less an authority than G. Betton Massey, M.D., of Philadelphia, in his recent work entitled, "Practical Electrotherapeutics and Diathermy." In his chapter on wave currents, we read:

"There has been so much confusion in the minds of physicians as to the nature and clinical indications of the various wave currents classed together as 'sinusoidal' that a clear separation and more definite labeling of these currents are greatly needed. To do this, it will be necessary to insist that there are two characteristics of the wave currents of variable power heretofore grouped together as sinusoidal.

"One characteristic is that the wave shall be a complete cycle of reversal of polarity produced by a mechanism that does this smoothly, with a sine curve. All alternating currents smoothly produced and of single cycle are therefore sinusoidal currents, in spite of the fact that if they are NOT FURTHER MADE TO SURGE in strong surges, composed of many of these RAPID SINUSOIDAL WAVES, they WILL PRODUCE TETANIC CONTRACTIONS AND NOT RHYTHMIC CONTRACTIONS. A Galvanic Current from any source passed through a machine for an alternate turn on — turn off — and similar smooth turn on of waves of opposite polarity in regular sequence, becomes also a sinusoidal current, and at the same time a rhythmic current of the greatest value if the waves are slow enough for the physiologic responses referred to below.

"The other characteristic, found only in currents labeled at present 'slow sinusoidal' on the labels of these machines, but which it is hoped manufacturers will PROPERLY label in the future 'rhythmic galvanic' and 'rhythmic nongalvanic' currents, is that, whatever form of current is supplied in rhythmic surges, be it rapid sinusoidal waves or the direct current in a sinusoidal wave, these should SURGE IN RHYTHMIC UNISON WITH THE NATURAL MUSCLE MOVEMENTS of the part of the body under treatment, such surges varying from about eleven per minute to about fifty per minute.

"As long as these slow waves are called by the same name as the rapid waves, there will be confusion. It cannot be too strongly urged that the name of rhythmic currents be applied to all rhythmically repeated surges of any current produced in periods adapted in their rhythm to the normal contraction periods of the part treated, the character of the rhythmic current being further indicated by the words 'galvanic' or 'non-galvanic.'"

We now understand that the effects described as mechanical are those produced entirely with the Sine Wave or Alternating Current. We also perceive that these effects may be described as an alternating contraction and relaxation of muscle tissue to produce exercise; a rhythmic motion; to restore tone, strength, and elasticity to atonic or atrophied muscle tissue; and to effect massage or manipulation of any organ surrounded by contracting muscle tissue.

Next we shall study the character of the current required to produce these mechanical effects, the speed and duration of the Surging Sine Wave Current, how it is controlled by the use of cams of varying shapes, and how these cams, seven in number, produce a rhythmic motion, timed to imitate the normal action of muscle structure in various parts of the body.

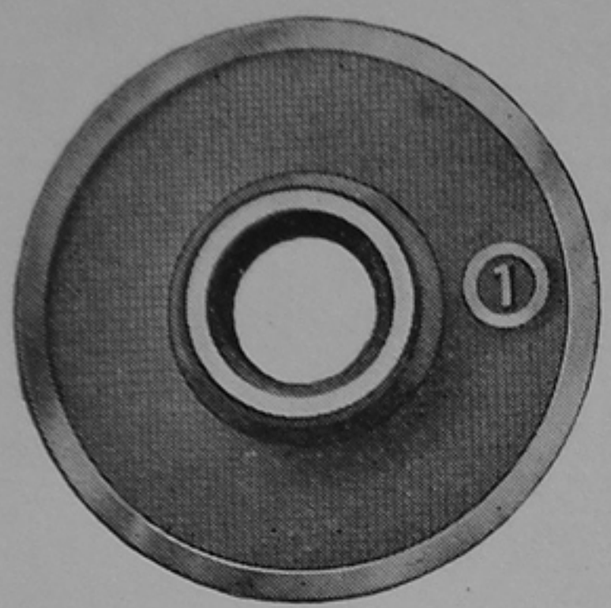
Let us first consider the SINE WAVE Current, in TWO forms: The non-surging and the surging.

The non-surging Sine Wave Current is a rapid alternating current of constant voltage, or potential, which may be regulated from zero to two hundred and fifty volts. This current has a wide range of strength, and produces a constant agreeable contraction of muscle tissue, the degree of which depends on the strength of current being used.

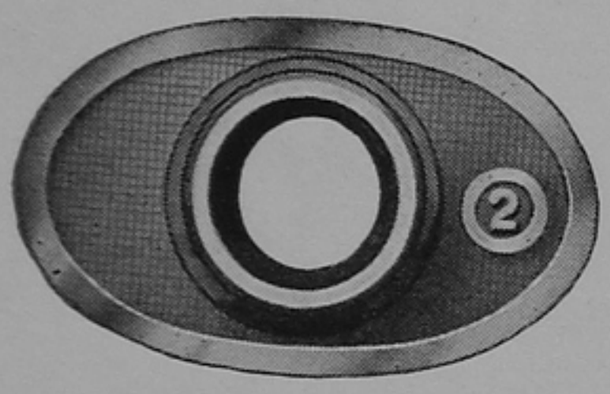
This non-surging, rapid alternating current induces a cellular activity. Its most valuable use is to produce short muscle contractions by stimulating nerve centers, controlled by a circuit-breaking switch on the handle of the electrode, and to relax muscle spasm when a sufficiently long application is maintained.

The Surging Sine Wave Current, the ideal current for producing smooth, rhythmic muscle exercise and massage, is selected and controlled by the use of seven cams described below.

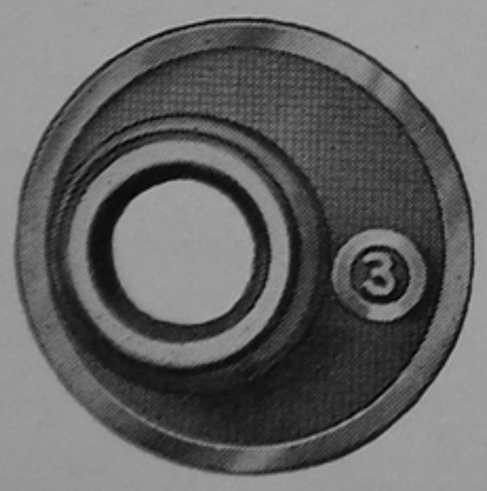
Cam No. 1 and Lever Lock



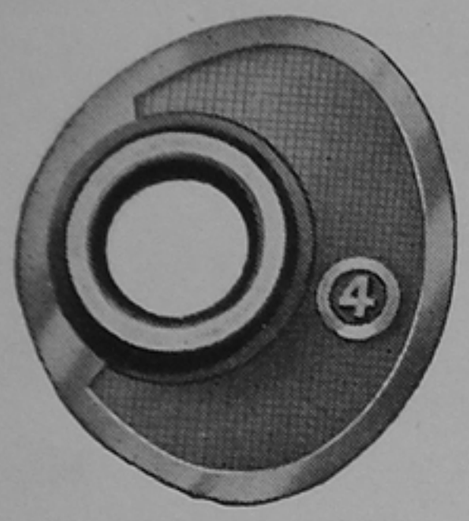
Cam No. 1 (or Lever Lock in position) produces non-surging currents or a constant voltage Sine Wave, Pulsating Direct and Galvanic Current, indicated in all conditions where no surge or muscle exercise is required.



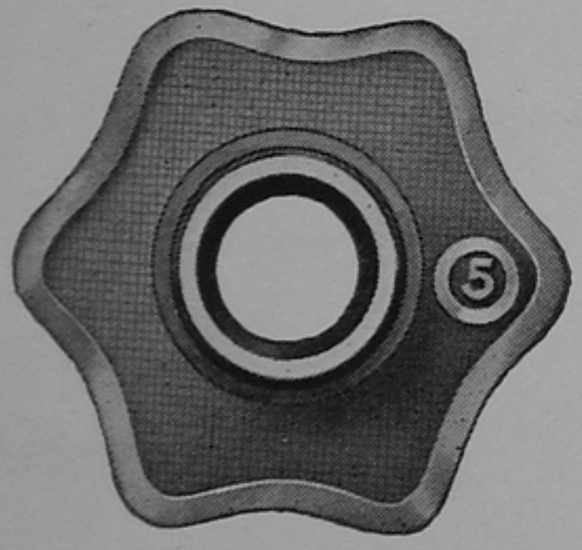
Cam No. 2 produces a current of twenty-two surges per minute, with equal periods of rest. It is indicated in conditions involving the muscles of which the normal contractions are approximately twenty-two per minute, such as muscles of the arm, including the deltoid and scapular region.



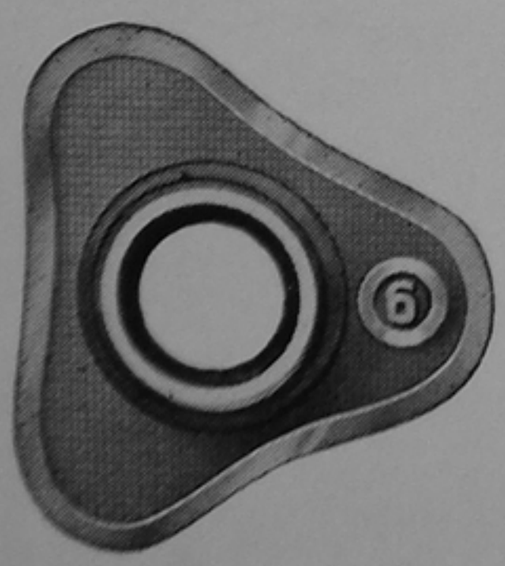
Cam No. 3 produces eleven surges per minute, and is indicated in all conditions in which a slow, gradual muscle contraction is desired, approximating eleven contractions per minute with equal periods of rest. This cam is particularly adapted to the treatment of involuntary muscles of the abdominal cavity, such as prolapsed stomach or colon, or sluggish peristalsis due to inertia, of which CONSTIPATION is an ever-present symptom.



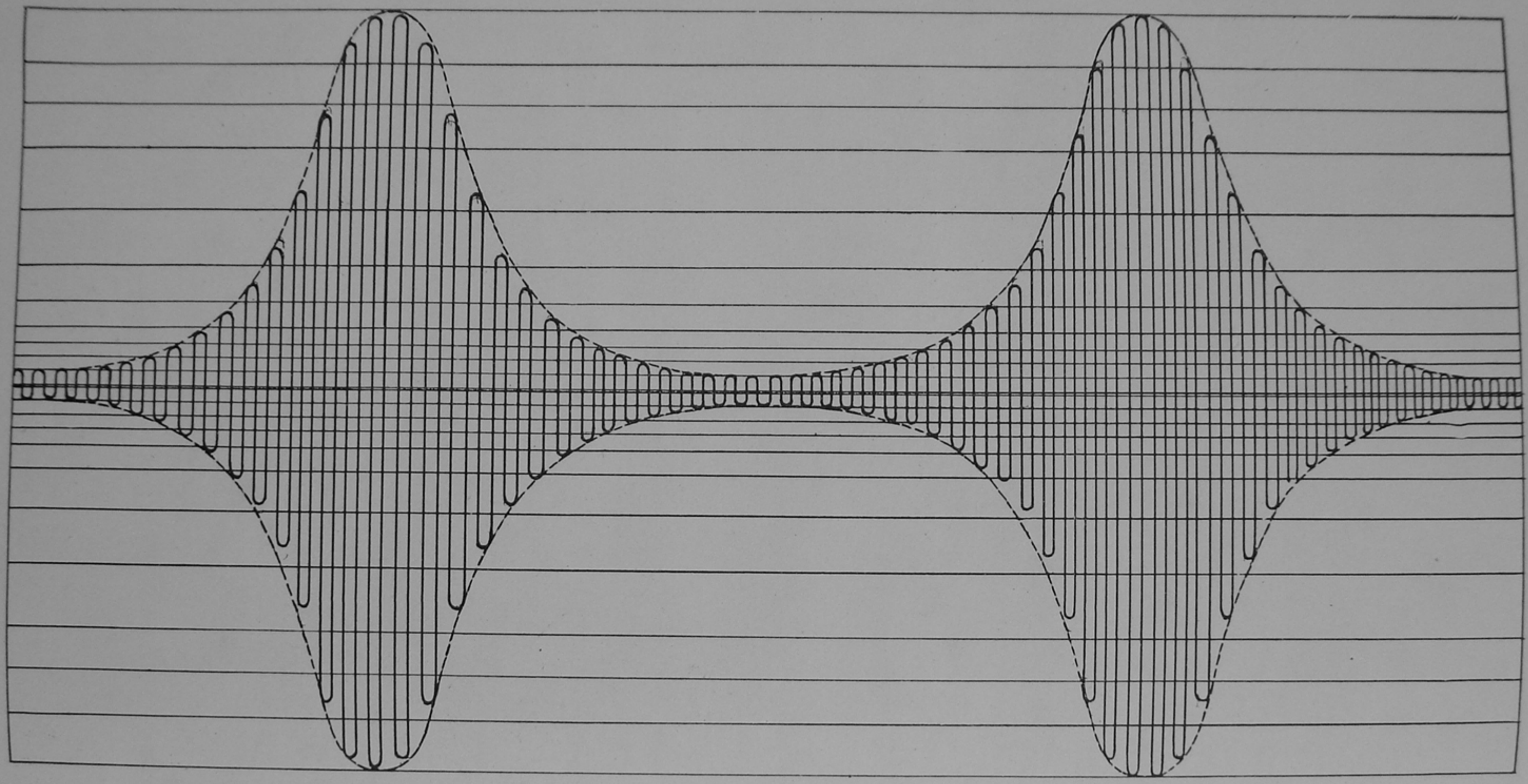
Cam No. 4 produces eleven surges per minute, causing the same rate of muscle contraction as Cam No. 3, but more vigorous in its action. Owing to the difference in its shape, Cam No. 4 causes the muscle structure to contract, the prolonged peak of the wave holding it in a contractile state for a longer period of time before relaxing. This cam is particularly indicated in treatment of the same conditions to which No. 3 is applied.



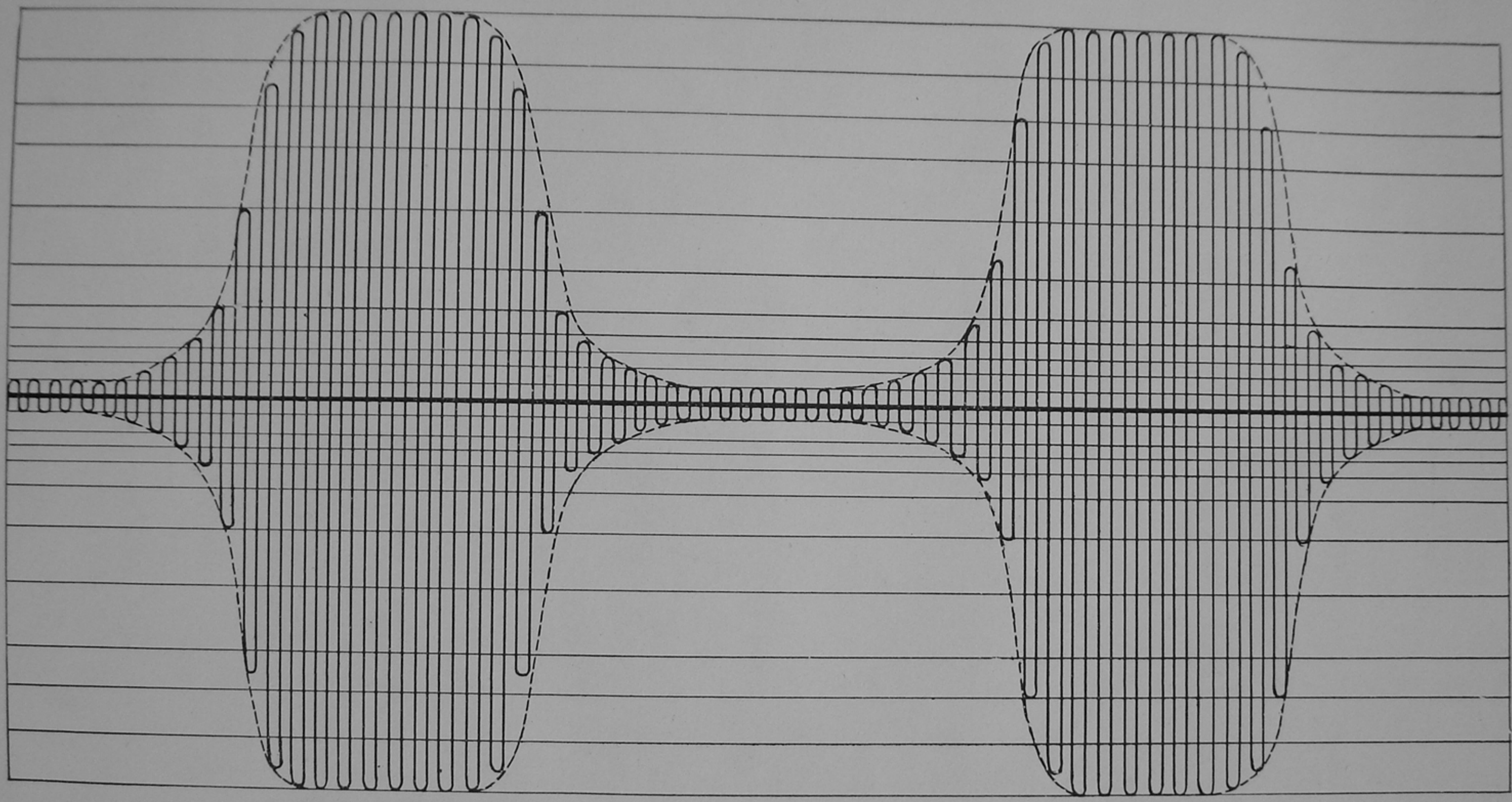
Cam No. 5 produces sixty-six surges per minute, the frequency of which is especially valuable in treating conditions such as facial paralysis, joint affections and adhesions.



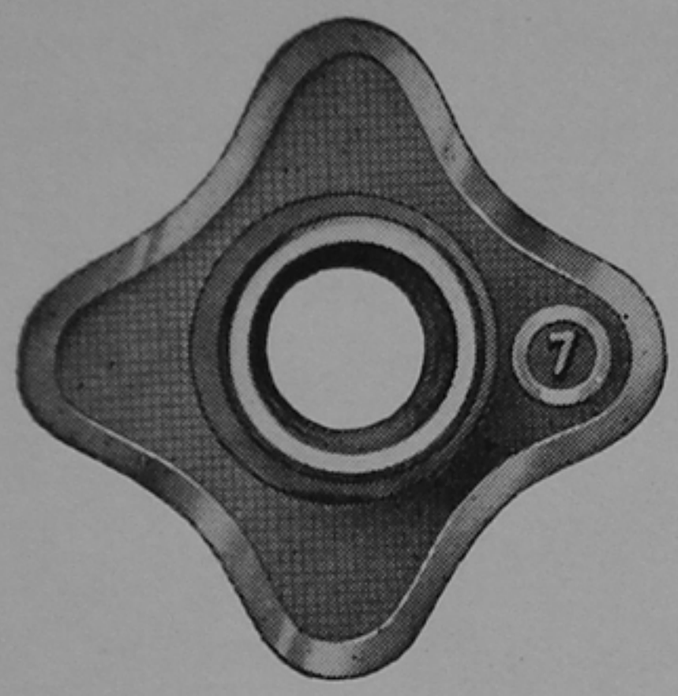
Cam No. 6 produces thirty-three contractions per minute and is especially indicated in conditions such as hypertrophy of the prostate, as this frequency nearly simulates manual massage.



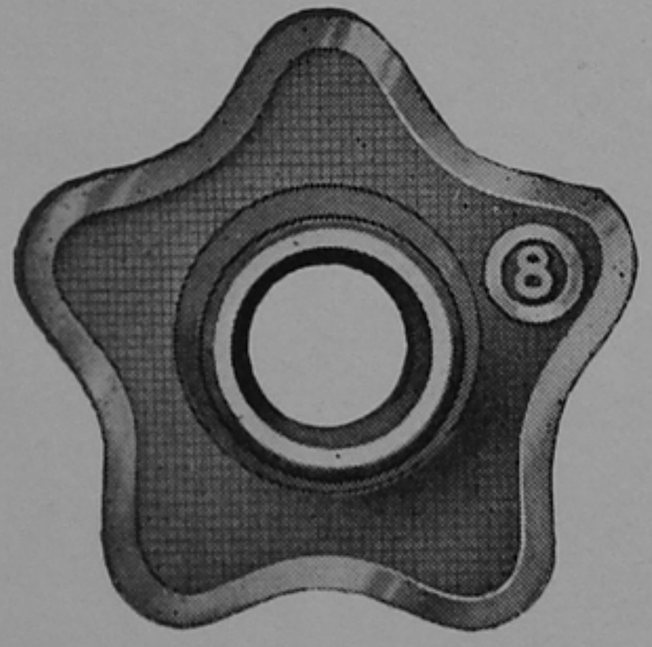
Surging Sine Wave (Sinusoidal) Current, Cam No. 3



Surging Sine Wave (Sinusoidal) Current, Cam No. 4



Cam No. 7 produces forty-four muscle contractions per minute, with equal periods of rest, and is indicated in all conditions in which muscle exercise is indicated requiring a medium activity of contraction, as in the treatment of obesity.



Cam No. 8 produces fifty-five contractions per minute and is indicated in conditions where exercise of muscles of the leg, thigh and foot are required.

In treating elderly and debilitated subjects, where the muscle action indicated above will be found to be slightly rapid, use cams that will provide muscle activity of the various parts mentioned at a slower rate, as the physician's judgment may dictate.

The Surging Sine Wave Current and Muscle Action

The muscles of the body are the immediate source of energy by which its parts are moved voluntarily or involuntarily. About seventy-five pairs of the two hundred muscles are used to maintain the general posture and movements of the body.

When any muscle or set of muscles fails to respond to the nerve impulse, which is its guide for action, it is because of some faulty function of the nerve itself, or impairment in the muscle involved.

That the whole digestive tract is a series of hollow muscular fibers, varying in strength and activity, is well understood. Any impairment of these involuntary muscles not only causes local disturbances, but also throws out of balance contingent or remote visceral structures.

We learn from physiological research that the various parts of the body have definite muscular action. If through injury or disease, muscular ability is impaired and an attempt is made to restore normal function by some electrical or physical means, and if the process thus instituted be much more rapid than is normal for the affected part, then fatigue and exhaustion may follow. If, on the other hand, the process used to restore lost ability is much slower than normal, metabolism fails to assert itself.

The "Morse" Wave Generator has been designed to produce a Sine Wave (sinusoidal) Current, of very rapid alternation. This rapid alternating current is caused to surge by the introduction of cams which are described in Chapter 1, constructed to cause definite predetermined and involuntary muscle action, which is so all-important in restoring normal physiological activities.

Physical Effects

In the following chapter we shall describe certain effects of low volt current application, which are best termed "physical." This term is used, owing to the fact that these effects are neither strictly mechanical nor strictly chemical, but do combine mechanical motion simultaneously with the introduction of the thermal and polar effects of the Direct Current, when caused to surge.

For example, the effect produced by a current of low milliamperage at the positive pole is to CONTRACT the tissue adjacent to the surface in contact. The effect produced at the negative pole is to RELAX the tissue adjacent to the surface in contact. Such effects, when current insufficient to produce decomposition or chemical changes within the tissue is being used, are considered "Physical."

Therefore, the low volt currents producing physical effects as above described are the non-surging, surging and interrupted Pulsating Direct Current.

Strictly chemical effects of the Galvanic Current are described in a following chapter entitled, "Chemical Effects."

The Pulsating Direct Current is not only a current flowing in one direction, from positive (+) to negative (—), but is also pulsating in character in that it travels in successive impulses, waves or ripples.

All direct current generators, large or small, whether driven at a low or a high speed, produce a direct current which is more or less pulsating in character.

The Pulsating Direct Current has one great advantage over the Galvanic for treating cases in which physical effects alone are required. It has a power of stimulation many times greater than the Galvanic, which is a direct current without pulsating characteristics. For

this reason it is many times more valuable where muscle contraction, exercise, together with thermal effects, relaxation of tissue and vasodilation at the negative pole, is indicated to increase circulation and nutrition to an area of partial degeneration, as in paralysis.

The Non-Surging Pulsating Direct Current

The voltage or current strength of THE NON-SURGING PULSATING DIRECT CURRENT remains constant at any desired point, depending upon the position of the control lever.

This current passes in one direction, from positive (+) to negative (—) pole, and when applied to human tissue directly opposite effects are manifested at the two poles.

Fluids within the tissue are diminished at the positive and increased at the negative pole.

Positive Pole Effects

The current enters at the positive pole, contracting tissue and causes vasoconstriction. It also relieves congestion and accumulates acid and oxygen.

Pain is due to pressure, immediate or remote. The positive pole of the direct current DIMINISHES THE BLOOD SUPPLY by its contractile action, not only on the surface but in deeper tissue as well. Therefore, it can be depended upon to relieve pain in the acute stages of inflammation or a temporary congestion.

Negative Pole Effects

The current leaving the tissue exits at the negative pole, relaxes and softens the tissue, causing vasodilation, and inducing congestion, increasing circulation and subsequent nutrition to the area being treated.

The negative pole dispels non-purulent effusions (as water on the knee), and extravasations by increasing circulation and stimulating absorption and accumulates Alkalies and Hydrogen.

Actual conditions for which these physical effects are recommended will be found listed alphabetically in a succeeding chapter on "Suggested Technic."

The Surging, Pulsating Direct Current

The Surging, Pulsating Direct Current is produced by the introduction of cams causing surges of exactly the same characteristics as are described in the previous chapter on mechanical effects, and in Chapter I under "Selected Motion Cams." This current produces the same muscle contraction and the physical effects before mentioned simultaneously.

The Surging, Pulsating Direct Current may, therefore, be used to produce muscle exercise, and at the same time by increasing circulation to supply nutrition to partially degenerated nerve and atonic muscle structure, as indicated in paralysis.

Interrupted Pulsating Direct Current

The interrupted Pulsating Direct Current may be described as the non-surging Pulsating Direct Current, rapidly interrupted by adjustment of collecting brushes in relation to the commutator bars.

Electro-Diagnosis

The electrical testing of muscles and nerves has become a most valuable aid in the diagnosis of conditions where partial degeneration of the nerve or muscle fiber is suspected.

Electro-diagnosis may be defined as the use of a low voltage current of the required character to produce

reaction of muscle and nerve tissue, the degree of which determines the extent of disability.

The writings of various present-day authors on this subject reveal comparative agreement on the physical effects which are required for the most expert electro-diagnosis. On the other hand, however, they reveal a partial disagreement as to the form or character of current best fitted to produce the desired effects.

One authority recommends the faradic current, because of its rapid interruption of induced current at a very high voltage. Another recommends the Galvanic Current interrupted by a rheotome. Still another gives the opinion that the current best suited for this particular work is the Galvanic Current interrupted by a switch in the circuit. This diversity of opinion leads many physicians to view electrical testing as a most complicated procedure, of value only to the man who can specialize in it.

However, designers of the Type A-25 "Morse" Wave Generator have made a careful study of electro-diagnosis in an effort to produce a current with characteristics best suited to meet all the requirements of nerve and muscle testing.

A consensus of opinion from various authorities clearly indicates that the desired physical effects are as follows:

The reaction of degenerate tissue varies greatly according to the state of degeneration which has taken place. When a current is passed through a healthy muscle, it encounters not only muscle fibers but also nerve fibers lying about them. Most nerve and muscle fibers are electrically excitable, but as the motor nerves are much more so than muscle fibers, the contraction of the muscle is due to the impulse received from the stimulated nerve.

The Interrupted Pulsating Direct Current of the "Morse" Wave Generator combines the value of the Galvanic, which may be interrupted by a switch on the electrode handle, with the greater stimulating qualities of the faradic current and without its disadvantages. This current is found to exactly fulfill these requirements.

The Pulsating Direct Current from the "Morse" Wave Generator is primarily a true direct current. Secondly, being pulsating in character, it increases the sensibility of nerve response; and thirdly, it is arranged so that it may be interrupted with extreme rapidity where the more tetanizing properties are desired, as in cases where one requires a maximum degree of stimulation with a minimum of current.

Another very important factor in determining the character of current best suited for electro-diagnosis is range of control. On the "Morse" Wave Generator the control is such that the current may be regulated very gradually and without possibility of interruption from the point where it is practically nothing, to the maximum degree of strength required.

Such delicate and accurate control can be secured only by employing the principle of magnetic induction and leakage. This eliminates the use of all rheostats, contact points and resistances of every nature, and insures the accuracy which is so essential in electro-diagnosis.

The necessity of accuracy, when repeating current dosage in testing the same muscle or nerve structure from time to time, may readily be understood, when one stops to consider his dependence on the degree of reaction over a period of treatment in order to determine whether or not he is producing results. It is, therefore, extremely essential to the operator that he should use the same strength and character of current each time a

(OFFERED ONLY AS A GUIDE. Frequency and length of applications, size and shape of Electrodes must depend upon individual cases.)

PATHOLOGY	Current	Cam	Resistance	M. A.	Time In Min.	ELECTRODE	REMARKS
Bleeding Hemorrhoids.	D. C.	1	2	3	10	Zinc or Copper tipped positive Electrode.	Use largest size pad Electrode on Abdomen.
Backache from Simple Misplacements.	A. C.	1	0	0	10	4x5-inch or 5x6-inch pads.	Leave vaginal Electrode in place and place pads each side of back. Current to toleration.
Bronchitis.	A. C.	2	2	0	On Each Side 10-15	Pads.	4x6-inch pad on back, 4x5-inch pad under clavicle. Treat each side separately or use Bifurcated cord to save time.
Brachial Neuritis.	D. C.	2	2	6-8	10	Pads to suit locality.	In acute cases use negative pad on back. In chronic cases use positive pad on back.
Constipation, (Intestinal Stasis.)	A. C.					See Pages 29-40 for Technic and Illustrations.	
Cerebral Congestion (Headache).	D. C.	1	2-3	3	10	Pads to suit.	Positive pad at occiput, negative pad at solar plexus or ankle.
Endometritis.	D. C.	1	1	3-5	5	Negative inter-uterine Electrode, Positive pad on Abdomen.	
Flat Foot (Distorted ankle or feet).	D. C.	1	2	10	10-15	Pads to suit.	Negative Electrode on inner side of foot. Positive Electrode on Tibialis Anticus. Follow up muscle behind knee with A. C. Cam No. 5.
Granular Conjunctivitis.	D. C.	1	0	3-5	5	Zinc or Copper tipped positive Electrode.	Negative pad on back near neck.
Hemorrhagic Form of Uterine Fibroids.	D C.	1	1	10-15	10	Inter-Uterine Copper or Zinc positive Electrode, Large Pads on Abdomen.	See pages 18-21. Turn current on and off slowly.
Infantile Paralysis.	D. C.	1	1	8	5-8	Pads to Suit.	Negative Electrode on spine, Positive at wrist, and negative Electrode on lumbar region, positive at ankle. Follow up with A. C. Cam No. 2 for arms, No. 5 for legs.
Lumbago (Lumbar Neuritis).	D. C.	1	1	10	10-15	Pads to suit.	Large positive pad on back over painful area. Negative on abdomen.
Menstruation (Profuse or irregular)	D. C.	1	3	15	10-15	Vaginal Positive Electrode.	
Migraine (Super-Orbital Pain).	D. C.	1	3	2-3	5-10	Pads—Positive on Head.	Moisten scalp thoroughly.
Oesophageal Stricture	D. C.	1	1	5	5	Negative Metallic Electrode	See foot not
Prostatic Enlargement.	A. C.	6-7			10-15	Prostatic Electrode.	Place patient on side, 6-x8-inch pad on abdomen. Use some device for holding prostatic Electrode in place. Three times weekly then less.
Pharyngitis.	D. C.	1	0	3-5	5	Zinc or Copper tipped positive Electrode.	Negative pad on back near neck.
Rectal Stricture.	D. C.	1	1	3-5	3-5	Negative Metallic Electrode.	See Foot Note.
Rheumatism.	D. C.	1	See Remarks	See Remarks	10-15	Pads.	Use strength of current as much as patient can stand. Look for cause during treatment.
Urethral Stricture	D. C.	1	1	3	3	Negative Urethral Electrode.	See foot note.
Uterine Prolapsus.	D. C.	1	1	15	10	Carbon Ball, positive Electrode.	Large negative Electrode on abdomen.
Vaginal Catarrh.	D. C.	1	1	10	10	Negative Abdomenal Electrode and positive Copper Electrode.	Reverse current before removing copper Electrode so as not to denude Mucous Membrane.

Foot Note—Do not try to hurry by using more current; rather go slow and repeat treatments, thereby preventing Cauterization and any chance of Cicatrical Tissue following.

SELECTED MOTION CAMS

Cam No. 1—Produces Cellular Massage without Surge.
Cam No. 2—Produces 22 Surges per minute.
Cam No. 3—Produces 11 Surges per minute.
Cam No. 4—Produces 11 Surges per minute.
Cam No. 5—Produces 66 Surges per minute.
Cam No. 6—Produces 33 Surges per minute.
Cam No. 7—Produces 44 Surges per minute.
Cam No. 8—Produces 55 Surges per minute.

The above named diseases are in the main the most important. Many others might be mentioned. A short study of Dr. Morse's book will permit the physician to determine the use of the methods used.

APPLY TO POINT OF TOLERATION IN THE APPLICATION OF ELECTRIC CURRENTS.

test is made. In the Pulsating Direct Current of the "Morse" Wave Generator we have one which combines the advantages of all other currents recommended for muscle and nerve testing, and which at the same time eliminates the many disadvantages encountered in their use.

Electrical Stimulation of Motor Points and Nerve Distribution as an Aid in Diagnosis and Treatment

The importance of one's ability to determine the actual functional activity of individual or groups of muscles by electro-diagnosis, for the purpose of determining the degree of paralysis, the reaction of degeneration, and in medico-legal conditions which are likely to arise in any physician's practice, cannot be overestimated.

The fact that all parts and organs of the body are sensitive to the electric current to a greater or lesser degree is well known, and also that this electro-sensibility may be definitely affected by disease.

Organs which are indurated or caused to become affected by disease are less sensitive to the current than normal, just as they are less sensitive to any other mechanical stimulation acting upon them.

Susceptibility of different patients to the application of electricity to the surface of the body will vary greatly.

In many cases of feigned disease, the patient's statements may be entirely ignored and muscles made to respond to direct current stimulus if healthy, regardless of his will.

The olfactory, gustatory, auditory, and optic nerves are specially susceptible to the action of the current, as proven by the production of sound, taste, smell and flashes of light.

In attempting to ascertain the truth by electro-

diagnosis, duplicate tests should always be made of the healthy as well as the impaired side, a rule which applies to all parts of the body.

Following are a few general rules which must be observed in electro-diagnosis.

The principal aim of this method is to localize the current of required density and strength upon parts of the body marked for investigation, avoiding, as much as possible, unnecessary excitation of the neighboring structures.

One pole only should be used for each muscle or nerve reaction expected, and while it is necessary to have the other electrode somewhere to complete a circuit, it is desirable to place it so as to eliminate effects at its point of contact, and may be called the indifferent electrode. It should be much larger than the exciting electrode, which must be of the proper shape and size not to overlap adjacent tissue. The exciting electrode is made one-half inch wide and one inch long.

The small point electrode is undesirable as the current is weakened by the small carrying capacity of the point, and the contraction not sufficiently definite and perceptible. On the other hand, one has occasional conditions where it is desirable to localize the examination between nerve areas not far apart, in which case, two small electrodes, as described, would effect a more accurate diagnosis.

The following charts illustrate by dots upon the motor points, and nerve exits, the points of contact for electrodes to produce the desired effects of electro-stimulation.

One should become very familiar with his apparatus, and practice by experimentation, so as to secure dexterity in manipulation. To secure accuracy in the interpretation of his results, it is well to test healthy parts, especially if there is only one side of the body

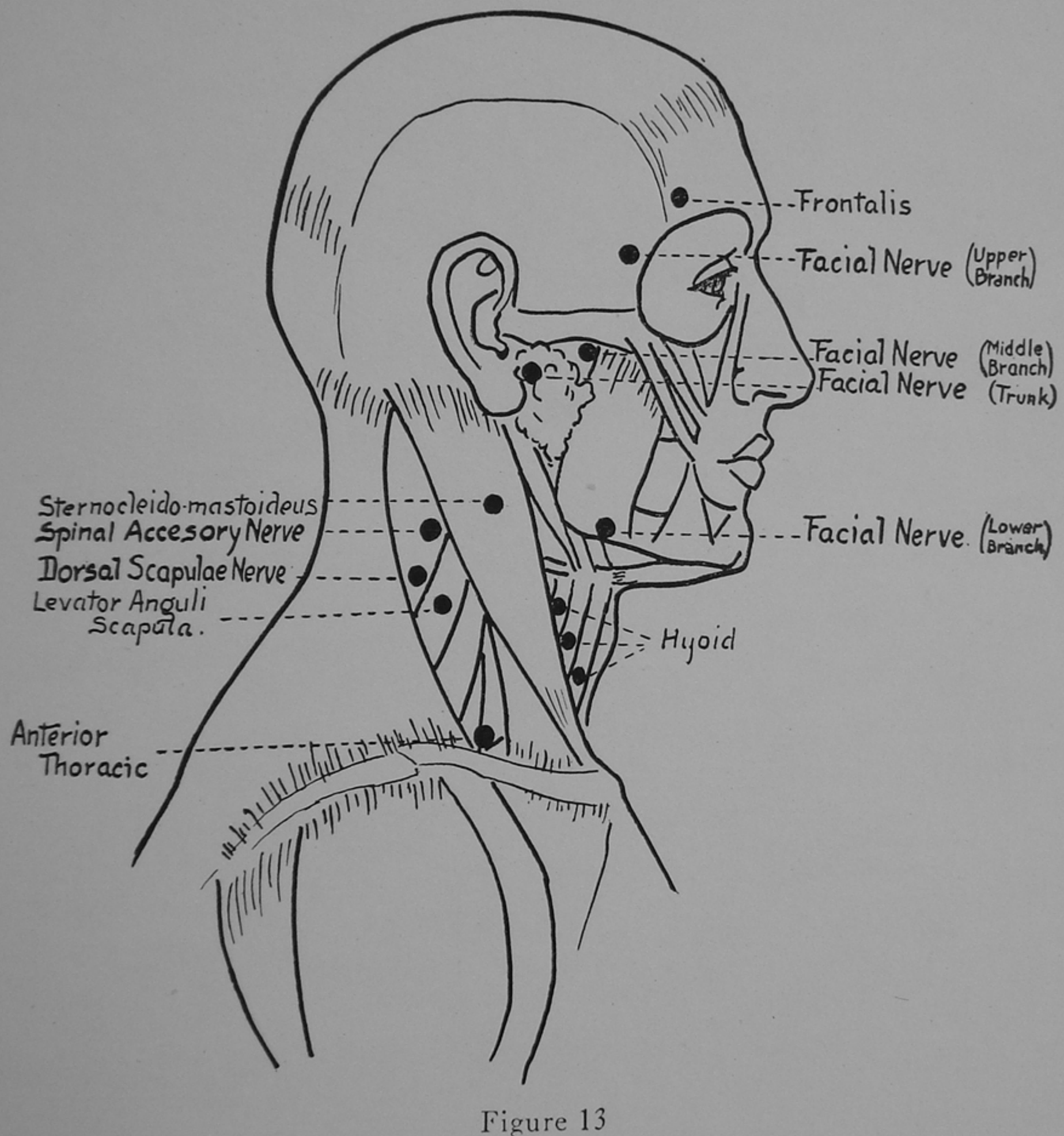

Frontalis
Facial Nerve (Upper Branch)
Facial Nerve (Middle Branch)
Facial Nerve (Trunk)
Facial Nerve (Lower Branch)
Sternocleido-mastoideus
Spinal Accesory Nerve
Dorsal Scapulae Nerve
Levator Anguli Scapula.
Hyoid
Anterior Thoracic

Figure 13

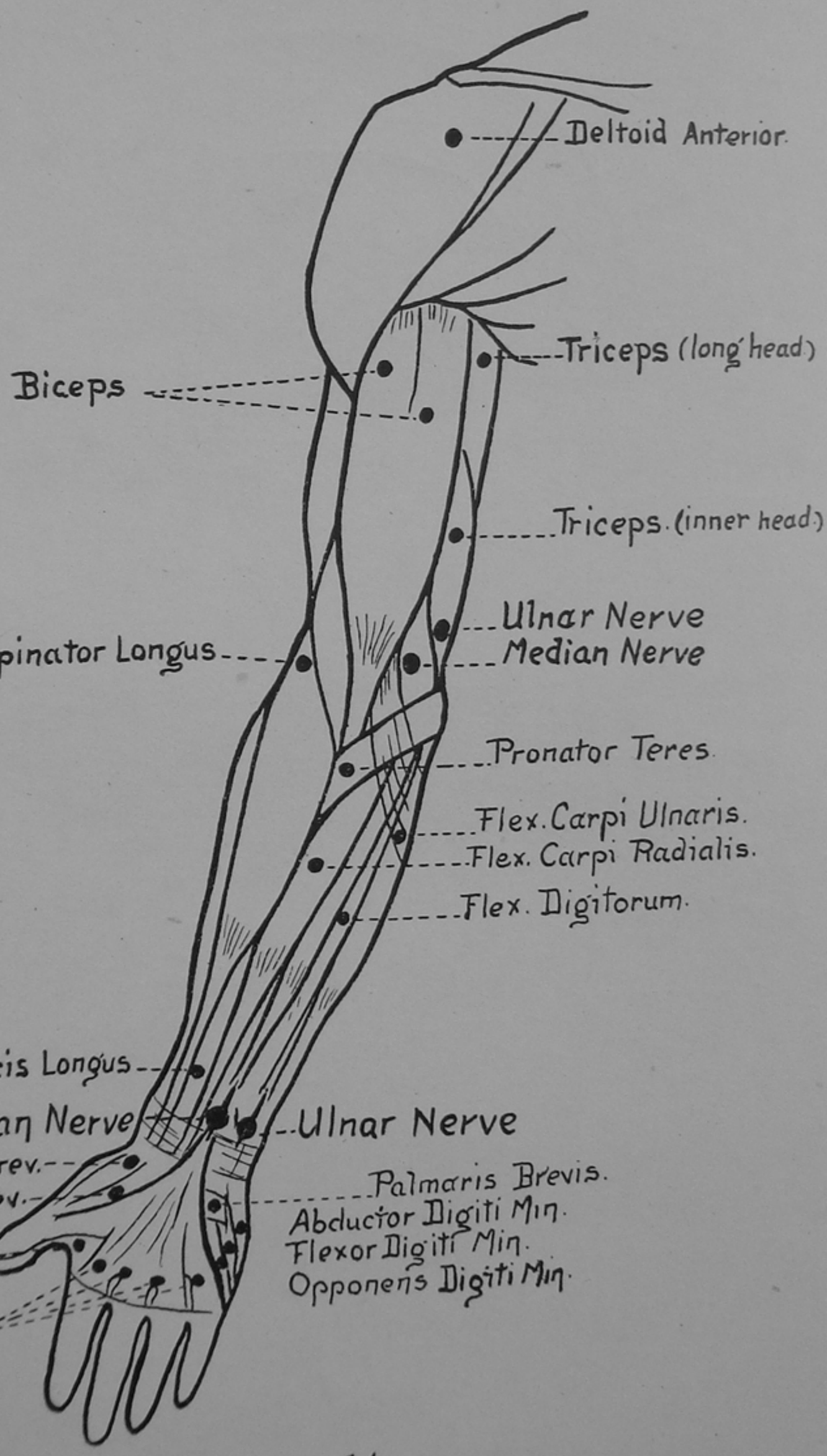

Deltoid Anterior
Triceps (long head)
Biceps
Triceps. (inner head)
Ulnar Nerve
Supinator Longus
Median Nerve
Pronator Teres
Flex. Carpi Ulnaris.
Flex. Carpi Radialis.
Flex. Digitorum.
Flex. pollicis Longus
Median Nerve
Ulnar Nerve
Abductor Pollicis Brev.
Flexor Pollicis Brev.
Adductor Pollicis Brev.
Lumbricales
Palmaris Brevis.
Abductor Digiti Min.
Flexor Digiti Min.
Opponens Digiti Min.

Figure 14

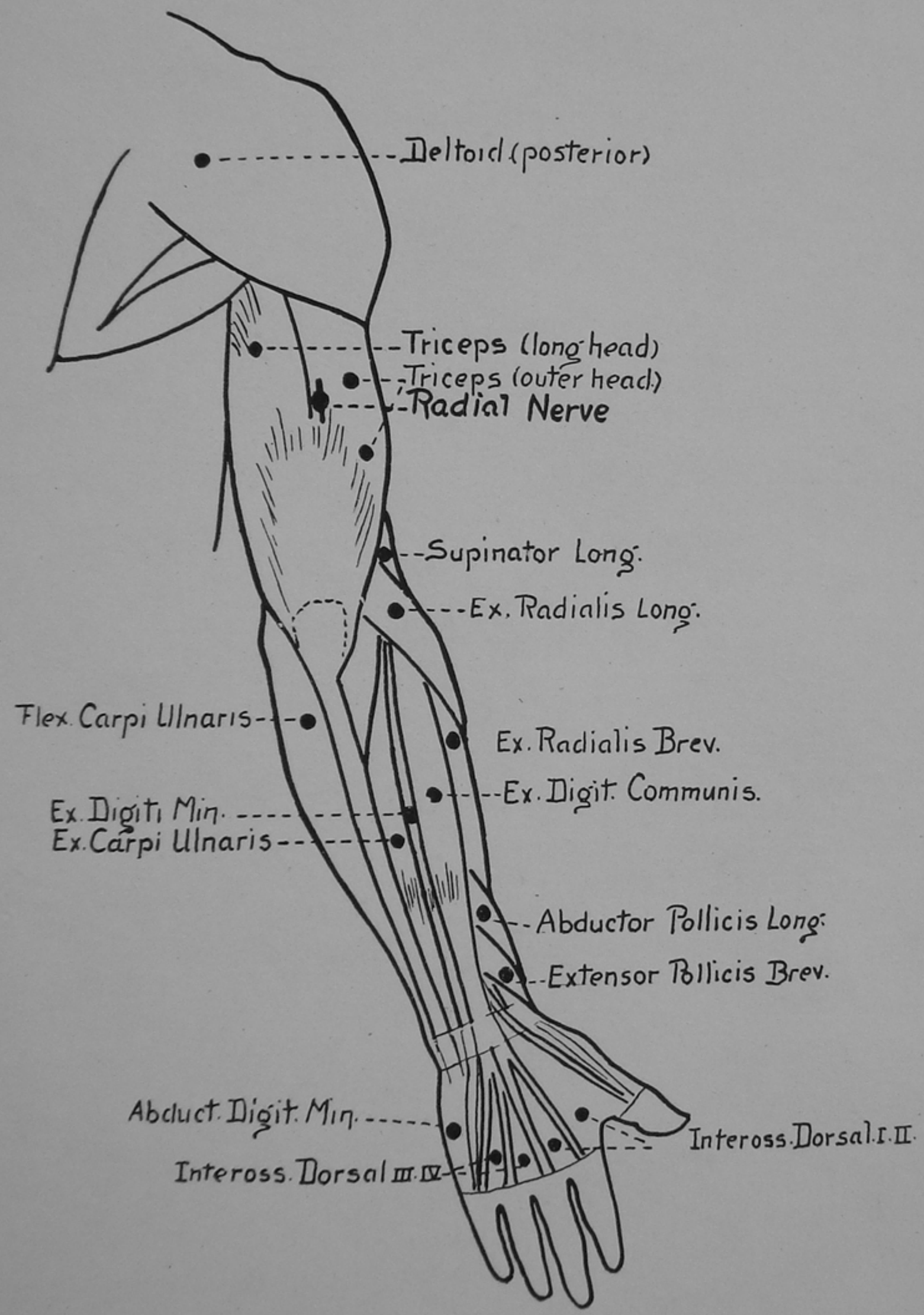

Deltoid (posterior)
Triceps (long head)
Triceps (outer head)
Radial Nerve
Supinator Long.
Ex. Radialis Long.
Flex. Carpi Ulnaris
Ex. Radialis Brev.
Ex. Digit. Communis.
Ex. Digiti Min.
Ex. Carpi Ulnaris
Abductor Pollicis Long.
Extensor Pollicis Brev.
Abduct. Digit. Min.
Inteross. Dorsal I. II.
Inteross. Dorsal III. IV.

Figure 15

diseased, so that one may obtain a standard of comparison.

It should always be kept in mind, however, that deeper and more pronounced contractions are obtainable by the Pulsating Direct Current than the others. To determine the strength of the current to be used, the resistance of the parts under examination indicated by the the distance between the poles and the degree of paralysis must be considered.

The reader will observe in the figures, dots illustrating the motor points of the muscles and the exits of important nerve trunks, at which points electrical susceptibility is the greatest. Application to any of those points about the facial muscles would be more susceptible and less current required than would be necessary in a similar exploitation of the deltoid muscles (Figure 15) or along the sciatic nerve (Figure 17), or similar comparison in different parts of the body.

An electrode placed on a nerve exit or muscle motor point to determine the amount of excitation should be placed on the spot indicated, either by direct sudden contact or by interrupted handle electrodes (see Figures 19 and 20).

Do not move the active electrode in an indifferent manner over the area under examination, as it is not only unsatisfactory, but is likely to give the patient an unpleasant muscle contraction.

For all the muscles about the face and neck, the indifferent or larger electrode may be placed over the lower cervical or upper dorsal vertebra and the various points determined from that.

In the examination of the arm the indifferent electrode may be placed over the nerve supply on the back and the active one over the nerve or muscle, or set of muscles, under consideration. If one muscle, for instance, only is involved, then the indifferent electrode

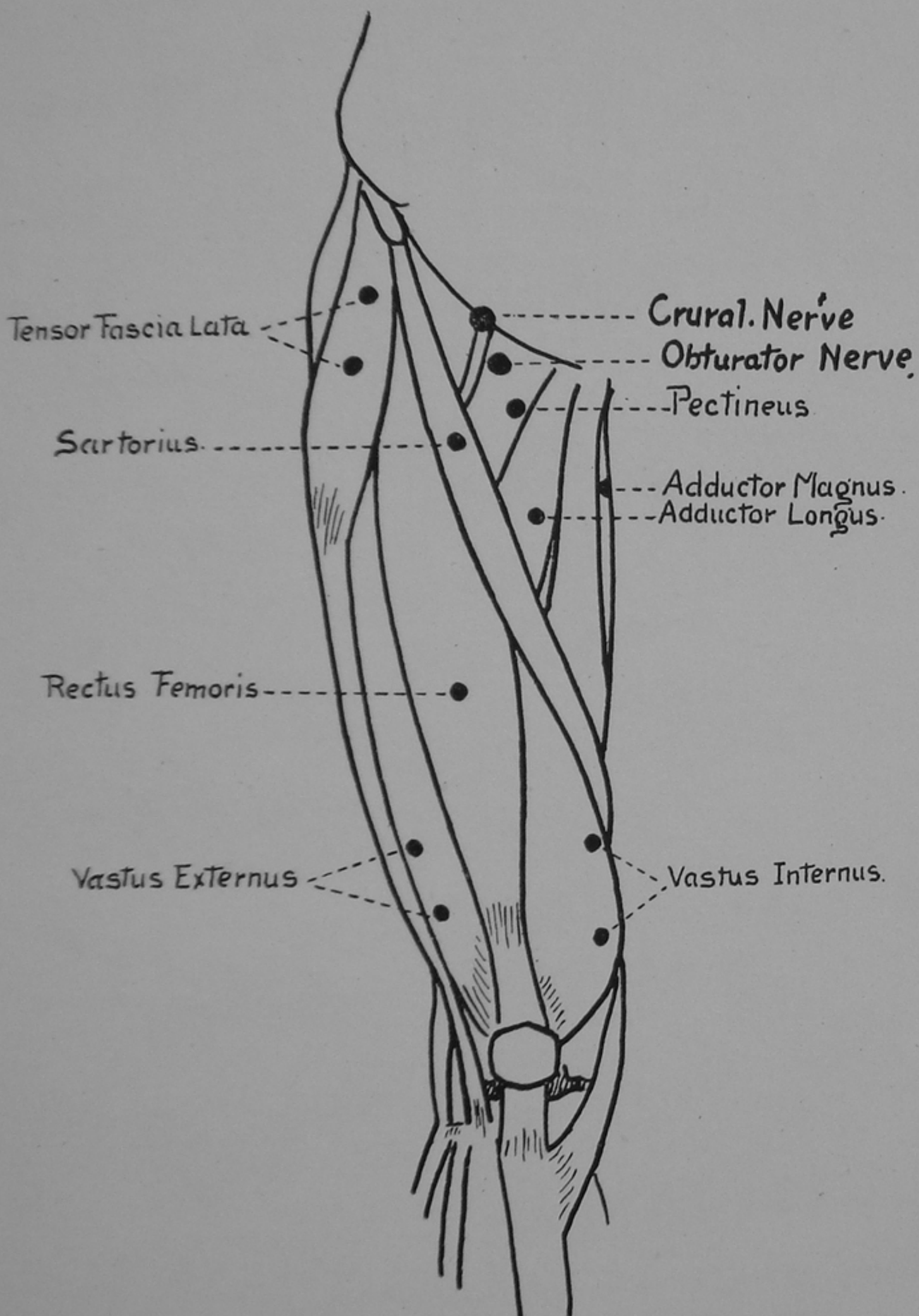

Tensor Fascia Lata
Sartorius
Rectus Femoris
Vastus Externus
Crural. Nerve
Obturator Nerve
Pectineus
Adductor Magnus
Adductor Longus
Vastus Internus.

Figure 16

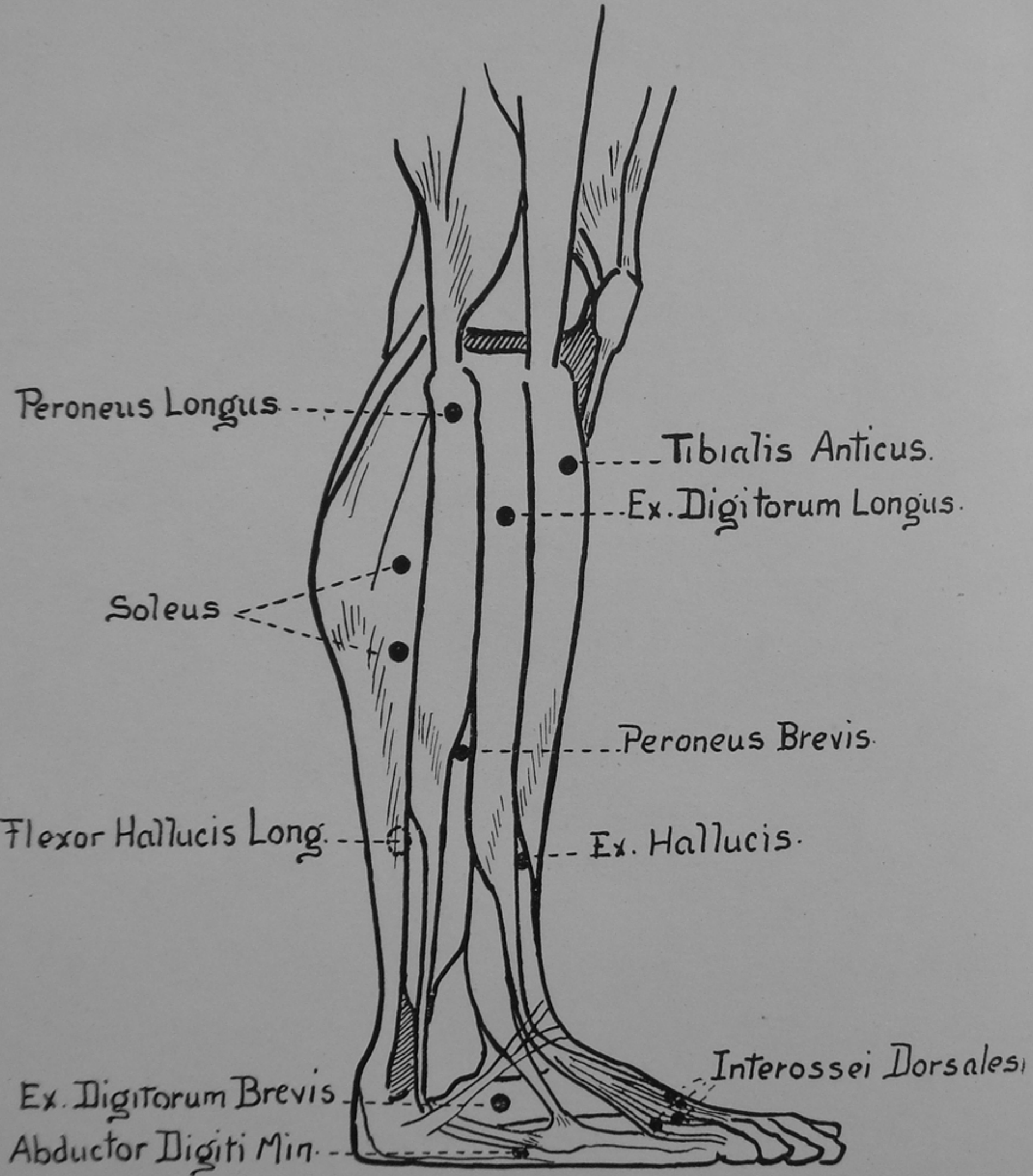

Peroneus Longus
Tibialis Anticus.
Ex. Digitorum Longus.
Soleus
Peroneus Brevis.
Flexor Hallucis Long.
Ex. Hallucis.
Ex. Digitorum Brevis
Abductor Digiti Min.
Interossei Dorsales

Figure 17

Gluteus Maximus
Adductor Magnus
Semitendinosus
Semimembranosus
Tibial Nerve
Biceps Femoris (cap.long)
Biceps Femoris (cap.brev.)
Peroneal Nerve
Gastrocnemius.(cap.ex.)
Gastrocnemius(cap.in)
Soleus.
Flexor.digitor.comm.long.
Tibial Nerve
Flexor Hallucis Longus.

Figure 18

may be fastened at the upper insertion of the muscle and the active one applied at the motor point below.

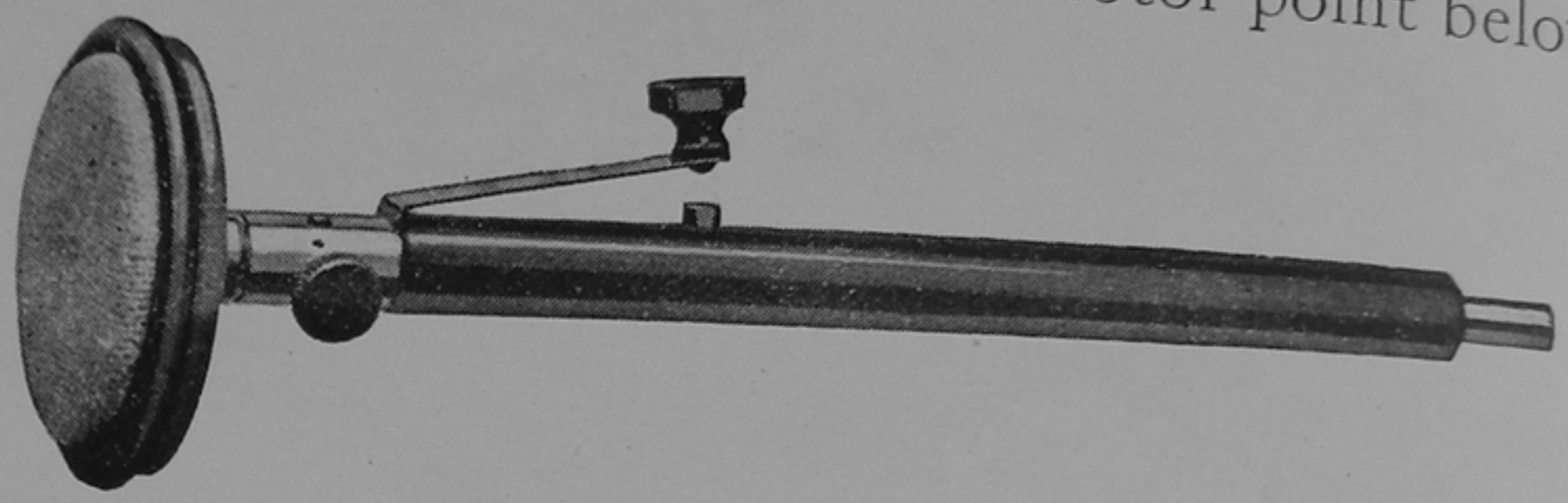


Figure 19

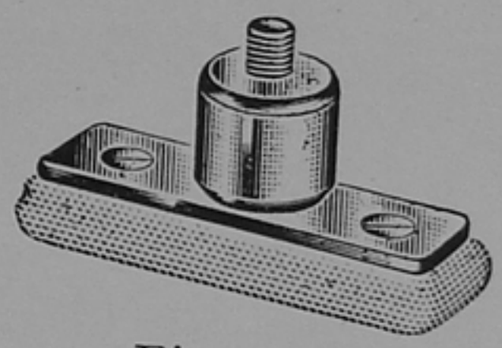


Figure 20

In the case of hand disability the indifferent electrode can be placed over the flexors at the elbow as in Figure 14 and the various motor points examined. The same applies to both the flexors and extensors.

In the examination of the thigh and leg, Figures 16, 17, and 18, the same technique is carried out as regards placing the active and indifferent electrodes for diagnosis and guide to treatment as described for the face and arm. The only difference is the greater the distance between the electrodes (more resistance) more current will be required to produce a similar effect.

In all cases it is usually more satisfactory to use the negative pole, as more pronounced reaction will be observed.

Those who are not familiar with the action of the Pulsating Direct Current would do well to practice upon themselves that they may become familiar, not only with what may be expected, but also the amount of current necessary to bring about the contraction of a healthy muscle. After such experience comparisons are more easily understood.

May every physician and surgeon who is called upon to treat cases of paralysis, peripheral nerve injuries and the like, study and understand the simple procedure of electro-diagnosis and be convinced of its value.

May we urge every physician interested in this subject to procure a copy of "Essentials of Medical Electricity" by Cumberbatch, which is published by the C. V. Mosby Company. Dr. Cumberbatch in this work devotes an entire chapter to the subject, "The use of the electrical current for testing the reaction of muscle and nerve." In this the subject is explained in a most simple and thorough manner.

Chemical Effects

The chemical effects of low volt currents are associated exclusively with the TRUE NON-SURGING GALVANIC CURRENT. This current, delivered by the "Morse" Wave Generator, is a direct current, without pulsation.

In developing and perfecting the new Type A-25 "Morse" Wave Generator, a valuable result has been attained by the introduction of a carefully designed filter unit in the circuit. This filter smooths out the ripples or pulsations which occur in direct currents produced by a generator, and thereby delivers a current which will produce positively and accurately the same therapeutic results as a battery current.

The Galvanic Current of the "Morse" Wave Generator is controlled without recourse to resistance of any description. One lever controls the strength of current from minimum to maximum by causing the stationary armature windings to approach and recede from the rotating permanent magnetic field.

By means of this magnetic control, it is possible to obtain a delightfully smooth, constant Galvanic Current,

which may be regulated to a small fraction of one milli-ampere, and which may be gradually increased to the desired strength without the possibility of any inter-ruption due to poor contact between surfaces, as occurs where switches or rheostats are inserted in the circuits.

Much of the work done with the Galvanic Current is very delicate in nature. It requires an extremely smooth current, delicately regulated, and demands a continuous uninterrupted circuit from the point of gen-eration to the patient. For this reason, it is extremely essential that any apparatus designed to produce the Galvanic Current should include in its construction as few switches as possible, as every switch necessitates a sur-face contact. This point or surface of contact may be-come dirty or loose, which condition, while it may afford a good contact for a current of high voltage, allows an extremely poor one for a current of low voltage, where perhaps only two to six volts and especially where only a fraction of a milliamperage is being used. Interrup-tion of current, due to poor contact, results in pain to the patient.

The only switch on the "Morse" Wave Generator is the pole changing switch which is impossible to elim-inate and still allow the operator to reverse the direction of current flow, as is sometimes desired, without chang-ing the wires on the electrodes.

The chemical effects of the direct or Galvanic Current may well include those known as interstitial electroly-sis, and metallic electrolysis or ionization, which when used for introducing medication is sometimes called cataphoresis or ionic medication.

Waddington says, "The terms 'Electrolysis and Ionization' are quite generally used synonymously. The distinguishing, therapeutic definition between them, however, may be termed thus: Electrolysis means the breaking up or destruction of a part or the whole of a

tissue by the constant current without the addition of extraneous substances from the electrode or otherwise; a process from within, out. In ionization we have a breaking up of chemical substances, or a diffusion from without, in, of remedial or sterilizing agencies."

This would define ionization or cataphoresis as one and the same thing, as cataphoresis must necessarily be ionization. It will no doubt be well to describe the introduction of the ion, be they ions of metal or of chemical compound in solution as ionization:

At the positive pole we have an increasing accumulation of acids, and at the negative an increasing accumulation of alkalis. Familiarity with this chemical action is absolutely essential for one who is using the Galvanic Current. Having obtained the knowledge of these chemical effects at the positive and negative poles, and using them without too much temerity or undue timidity, the physician has at hand a two-edged weapon, which gives a wider range of usefulness in the treatment of disease so far as local applications are concerned than all other methods combined.

Major C. M. Sampson, in his recent work, "Physiotherapy Technic," pages 277 to 287, describes the process of ionization most excellently. He states, "When a polarity current (meaning direct current) passes through the solution, the cations travel toward the cathode and the anions toward the anode. Oxygen (acid maker) being an anion, travels to the positive pole (principally in the hydroxyl ion OH), thus after the Galvanic Current has passed between two electrodes for some time, the tissues adjacent to the positive pole become acid in reaction, while those immediately under the negative pole become alkaline from the hydrogen-ion concentration. An acid condition of tissues tends to sedation, and an alkaline condition to irritation, hence the positive pole is more sedative in character,

while the negative pole is irritating. The positive pole acts as a vasoconstrictor, hence has a tendency to check hemorrhage, while the negative acts as a vasodilator and tends to increase hemorrhage. When the current is condensed to destructive density the positive pole acts as an acid caustic, and the scar is a typical acid scar — dry, hard, and contracting in character, whereas the negative acts as an alkaline caustic, and the scar is the typical alkaline burn scar — soft, noncontractile and usually nonadherent. Where the current density is not pushed to the destructive point, the positive dehydrates and hardens and the negative pole softens or fluidifies tissues."

How and why does the direct or Galvanic Current produce the effect known as interstitial electrolysis?

Electrolysis is the decomposition of a chemical compound into its constituent parts by an electric current,— the Pulsating Direct and Galvanic Currents are the only ones used for that purpose.

Interstitial electrolysis is a process whereby tissue is dissolved, within a local area, by contact with a metal electrode to which the negative pole of the direct current is connected. At the same time the positive pole is connected to a surface indifferent electrode placed anywhere on the patient's body, but preferably not too far from, and if possible opposite the negative, which in this case is the active electrode.

The current under those conditions enters the indifferent electrode (positive pole), passes through the intervening tissue and out at the active metal electrode (negative pole), which is in contact with the tissue, and at which point the dissolving process takes place.

If a direct current is made to pass through a liquid composed of different elements, a chemical action is set up, which results in a separating process of its ingredients. When such process is applied in a proper man-

ner to living tissue, a local destructive action is inaugurated at the point of negative pole contact and interstitial electrolysis takes place. Here the degree of destruction depends on the strength of current being used, and the length of time it is permitted to flow.

Physicians are constantly seeking improved and more efficient methods of treating cervical stenosis, urethral strictures, rectal strictures, etc. Those who have once used the Galvanic Current, in cases of stricture, will never attempt treatment by other means, until first using this method. There are cases, of course, which prove to be strictly surgical, and in which the Galvanic Current would not be indicated, but these are very few compared with the large number which readily respond to electrolysis.

The physiological action of this current when passing through living tissue is to elevate the temperature of the section through which it passes. Where a metal contact is made upon the skin of healthy, living tissue, a burning sensation takes place at either pole, but it is much more distinct and stimulating at the negative or exit of the current.

If a sufficiently strong current be used when two metal (pointed) electrodes are applied to a portion of the body, it will be found that at the positive point of contact there will be a constant contraction of the skin. If a sufficient amount of current is used, a burn will take place at this point, and will leave a scar, hard and dry in character, and more or less bleached, caused by a diminution of blood supply.

At the negative pole, with the same strength of current being used, the parts will become red and congested, due to the increased blood supply, and if the current is made sufficiently strong, a burn will ensue, as at the positive pole. In this case it will be different in char-

acter, being soft, spongy and yielding, leaving an ulcerous scar difficult to heal.

It will, therefore, readily be seen that the current at the positive pole produces an astringent effect, and at the negative pole, a relaxing effect.

Anti-Hemorrhagic Properties

Observing, as we do, the astringent effect of the current at the positive pole, we can readily understand why the current applied through a metal electrode at that point of contact would quickly relieve hemorrhage. Also, we can understand why the negative pole, when applied to a stricture, scar, or other fibrous tissue, will soften and dissolve it.

Metallic Electrolysis

Metallic electrolysis is a process by which certain metals are oxidized when placed in contact with a moist surface, at the positive pole. An inflamed mucous membrane is the usual field of application, and copper or zinc tip electrodes are commonly used.

The proper method of procedure embraces the use of metal-tipped electrodes, correctly conforming to the cavities in which they are to be used. For illustration, in a case of vaginal catarrh, the operator would use the abdominal surface electrode as the indifferent one, attaching to it the negative pole. The positive pole should be attached to the metallic vaginal electrode and inserted in contact with the mucous membrane.

In this case the electrode is of copper. A current of 5 to 10 M.A. is used for a period of about ten minutes, causing oxidization of the metal and forming an oxic-chloride of copper at the point of contact. The current flowing from positive to negative pole causes this astringent deposited on the inflamed surface to be

passed into the tissues sufficiently to have a more curative action than could possibly occur, were a solution of copper or other metal used. Care should be taken, not only that the insertion of the electrode be made without undue pain, but also that its removal may not denude the mucous membrane. To remove electrode, turn current off gradually, reverse polarity and increase again to half strength used for two minutes. The negative pole will quickly release the tissues adhering to the electrode without having any contra effect on results obtained.

In the treatment of bleeding hemorrhoids, erosion of the cervix, granular conjunctivitis and pharyngitis, metallic electrolysis produces the desired results much more rapidly than any other method. Greater care in the arrangement of voltage and amperage, however, must be observed in the treatment of areas correspondingly more delicate.

The advantages of this method over local applications of sulphate of copper in stick or in solution, or of zinc in paste or solution, or of iron in solution, are as follows:

First, the medicinal action of the metallic salt upon the diseased surface is more accurately localized, as, for instance, in the treatment of a deep sinus, a copper probe may be carried to its bottom and the copper salts deposited there where most needed;

Secondly, drugs introduced into the system in a nascent state are much more active than in chemical combination;

Thirdly, the salts formed are driven into the tissues, rather than laid upon the surface of the mucous membrane, as in ordinary topical applications;

The technique of the treatment is similar to that of any galvanocaustic application, save that necessarily the positive pole is always the active one, and the electrodes take the form of bulbs and needles of copper.

zinc or iron. These are the metals which seem to have the widest range of usefulness as therapeutic agents.

When astringent or sedative effects are desired in a cavity without the introduction of ions of metallic substances, such as copper or zinc, electrodes constructed of pure carbon are used.

Waddington gives the following simple table of useful substances, which may be applied by ionization, when the POSITIVE POLE is connected to the active electrode:

Copper, zinc
Lithium compounds
Copper, zinc and magnesium salts
Cocain for superficial effect only
Quinine
Adrenalin
Calcium chloride

When NEGATIVE POLE is connected to the active electrode:

Iodine and its various preparations
(Lugol's solution, potassium iodide)
Sodium chloride
Sodium salicylate

Leduc's table of velocities shows that the different ions travel at varying rates of speed into and through the tissues. The chlorine ion travels almost twice as fast as a zinc ion, and this latter moves a trifle less quickly than the mercury ion. However, all ions are capable of traveling twice as fast when the solutions are applied to tissue of less resistance than the skin. When using substances in solution, it is generally agreed that weaker solutions give much better results than the heavier solutions and that a solution of 2 per cent is the one most generally used.

Technic

Suggested Technic for the Use of Low Volt Currents of Physiotherapy

The technic suggested in the following pages has been compiled after a careful perusal of many text-books and a study of the technic employed by many prominent medical men now using low volt current generators. The technic is offered simply to suggest a basis of procedure when applying the *low volt currents* of physiotherapy in conditions where they are indicated. It necessarily cannot be followed to the letter, as conditions in individual instances will often alter methods of procedure, length of time of treatment, and the current used.

A careful study of the following, together with reference to the chapters on effects and physics of the current suggested, will enable the physician to intelligently work out his own technic, and to apply it with best possible results to the case in hand.

Adhesions

Post-operative, intra-abdominal and pelvic adhesions may be prevented by using the Surging Sine Wave Current as soon as possible after the wound is healed and acute symptoms subside, thus eliminating the long-continued use of abdominal supporters.

Technic: Surging Sine Wave Current.

Surface electrode 5 x 8 on back opposite surgical area.

Surface electrode 4 x 5 over surgical area.

Cam No. 2 or No. 4.

Current sufficiently strong to cause, at first, mild contractions, then gradually increasing its strength with

each successive treatment depending on the condition of the surgical area and the comfort of the patient.

Time of treatment, 10 minutes.

Frequency of treatment, two or three times weekly.

Treatment of Adhesions already formed:

Technic: The Surging Pulsating Direct Current.

Surface electrode 5 x 8 on back. Positive pole.

Surface electrode 4 x 5 over scar. Negative pole.

Cam No. 2 or No. 6.

Current strength 10 to 15 M. A., determined by toleration of patient.

Time of treatment, 10 minutes.

Frequency of treatment, two or three times weekly.

Amenorrhea

Unmarried Women

Technic: Non-Surging Galvanic Current.

Surface electrode 5 x 8 over upper lumbar region. Positive pole.

Surface electrode 4 x 5 over one or both ovaries as indicated. Negative pole.

Cam No. 3, if surge is used.

Current strength, 10 to 15 M. A.

Time of treatment, 20 minutes.

Frequency of treatment, three times weekly.

Married Women

Technic: Non-Surging Galvanic Current.

Surface electrode 4 x 5 over abdomen. Positive pole.

Vaginal carbon ball electrode covered with cotton, well moistened with water, in place. Negative pole.

Current strength, 10 to 15 M. A.
If surge is required, use Cam No. 3.
Time of treatment, 20 minutes.
Frequency of treatment, three times weekly.

Anæmia

Technic: General ultra violet radiation, followed by stimulation with the Surging Sine Wave Current.
Surface electrode 5 x 8 over abdomen.
Small surface electrode over dorsal spine.
Cam No. 7.
Current strength, patient's toleration.
Time of treatment, 10 minutes.
Frequency of treatment, as indicated.

Ankylosis, Partial

Technic: Diathermy to thoroughly heat the tissue and to increase circulation, followed by
Surging Sine Wave Current.
Surface electrode of proper size to cover area on each side or above and below the joint.
Cam No. selected with regard to muscle activity of part to be treated.
Current strength sufficient to deeply massage all musculature and to produce motion if possible.
Time of treatment, 10 to 15 minutes.
Frequency of treatment, three times weekly.

Arthritis

A condition usually the result of a foci of infection which is more often than otherwise traceable to the colon.

In such cases when the diagnosis discloses constipation, treat as for intestinal stasis, see Technic, pages 72 to 86, and follow with local applications at the joints as follows:

Technic: Diathermy followed by Surging Sine Wave Current.
Surface electrode 4 x 5 on either side of or above and below the joint on opposite sides.
Current strength to comfortable toleration.
Cam No. 2 or No. 7.
Time of treatment, 15 minutes.
Frequency of treatment, three times weekly.

Asthma

When no cause is discovered, or when the cause has been treated by usual medical procedures, the following technic will relieve the spasm.

Technic: Non-Surging Pulsating Direct Current.
Surface electrode 4 x 5 over each lung, connected together.
Surface electrode 3 x 9 over cervical vertebræ.
Current strength, 10 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, daily or tri-weekly as required.

When emphysema is present, because of relaxed longitudinal muscles, the Surging Sine Wave Current will often give relief.

Technic: Surging Sine Wave Current.
Surface electrode 3 x 9 over lower cervical and upper dorsal region.
Surface electrode 4 x 5 alternately over each lung.
Current strength, toleration of patient.
Cam No. 2 or No. 6.
Time of treatment, 15 minutes.
Frequency of treatment, daily or tri-weekly as required.

This contracts the longitudinal muscles and expels the residual air from the lungs.

Atrophy, Muscular

If the nerve is functioning:

Technic: Surging Pulsating Direct Current.
Surface electrode 3 x 9 on spine over nerve supply. Positive pole.
Small diagnostic electrode on motor point of atrophied muscle. Negative pole.
Cam No. selected with regard to normal muscle activity of affected area.
Current strength, sufficient to induce slight muscular reaction.
Time of treatment, 10 minutes.
Frequency of treatment, three times weekly.

If reaction of degeneration is apparent:

Technic: Non-Surging Pulsating Direct Current.
Surface electrode 5 x 8 on the back. Positive pole.
Small diagnostic electrode with interrupter handle. Negative pole.
Current strength, 5 M. A.
A moderate current tolerance is used for motor points of the muscle.
Time of current flowing, three or four seconds followed by equal periods of rest over each motor point.
Frequency of treatment, daily at first, then three times weekly.

Care should be exercised to not overstimulate the nerves or tetanize the muscles.

Backache

Caused by fatigue or strain:

Can be relieved by the application of radiant heat, followed by the Non-Surging Pulsating Direct Current.

Technic: Non-Surging Pulsating Direct Current.
Surface electrode 5 x 8 on abdomen. Negative pole.
Surface electrode 4 x 5 over painful area. Positive pole.
Current strength, 10 or 15 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, as required.

Brachial Neuritis — Acute

Brachial Neuritis is best treated by the Galvanic Current. In the acute stage, place the electrodes on the back and on the anterior shoulder, with negative pole back, and positive pole front.

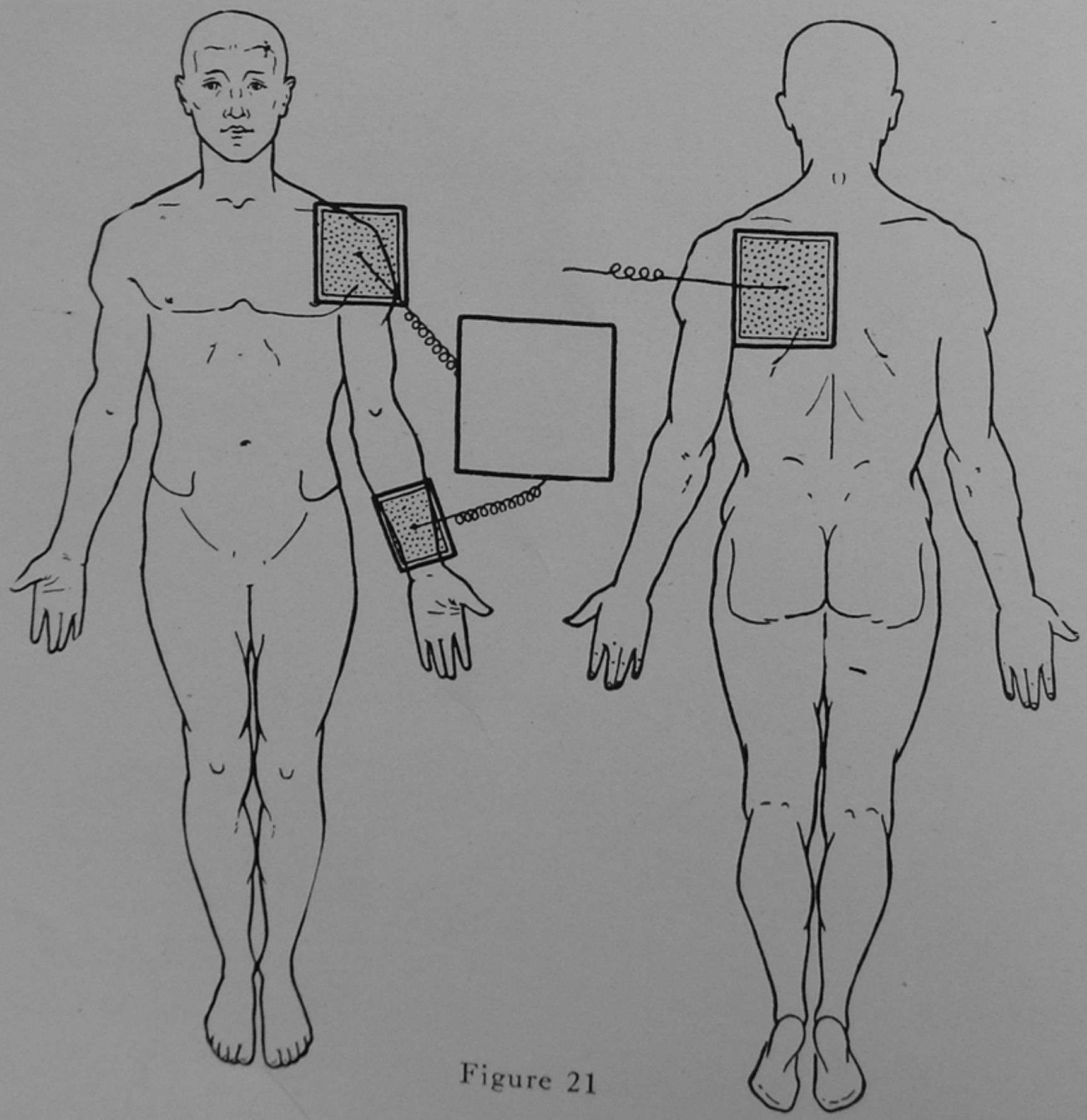


Figure 21

In sub-acute or chronic cases use the Galvanic Current with positive pole back, and negative pole front, for ten minutes. If pain extends down the arm the seance may be divided between shoulder and forearm, using following technic:

Technic: Non-Surging Galvanic Current.
Rectangular electrode wrapped around wrist. Negative pole.
Surface electrode 4 x 5 thoroughly saturated with hot water applied over the clavicle. Positive pole.
Current strength, 5 to 8 M. A., no more.
Time of treatment, 15 minutes.
Frequency of treatment, three times weekly, daily if severe.
Chronic cases, above technic followed by Surging Sine Wave Current.

Technic: Surging Sine Wave Current.
Surface electrodes placed as above.
Cam No. 2, No. 4 or No. 6.
Current strength, sufficient to contract muscles without too much pain.
Frequency of treatment, three times weekly.

The above technic may at first aggravate pain, which will subside after muscles have worked.

In acute inflammatory neuritis, *the Sine Wave Current should not be used.*

Bronchitis — Sub-Acute or Chronic

May be relieved by using the Surging Sine Wave Current.

Technic: Surging Sine Wave Current.
Surface electrode 5 x 8 on back.
Surface electrode 4 x 5 below clavicle toward medial line.
Cam No. 2.

Current strength, toleration of patient.
Time of treatment, 10 minutes.
Frequency of treatment, three times weekly, daily in the beginning if possible.

Bronchiectasis

Diathermy through region of dilated bronchus followed by:
Technic: Surging Sine Wave Current.
Surface electrode 5 x 8 over chest approximating the location of dilated bronchus.
Small surface electrode 3 x 3 over fourth and fifth cervical vertebræ.
Cam No. 2.
Current strength, patient's toleration.
Time of treatment, 10 minutes.
Frequency of treatment, three times weekly.

Chilblains

Technic: Diathermy followed by Non-Surging Galvanic Current.
Surface electrode 5 x 8 above the knee. Negative pole.
Foot in warm water in glass tray with contact for positive pole.
Current strength, 10 to 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, daily or three times weekly.

Cerebral Congestions, Headache

Cerebral congestion, which so often accompanies sleeplessness, hysteria, high blood pressure, or reflex, may come from the liver, intestinal disturbances and other causes.

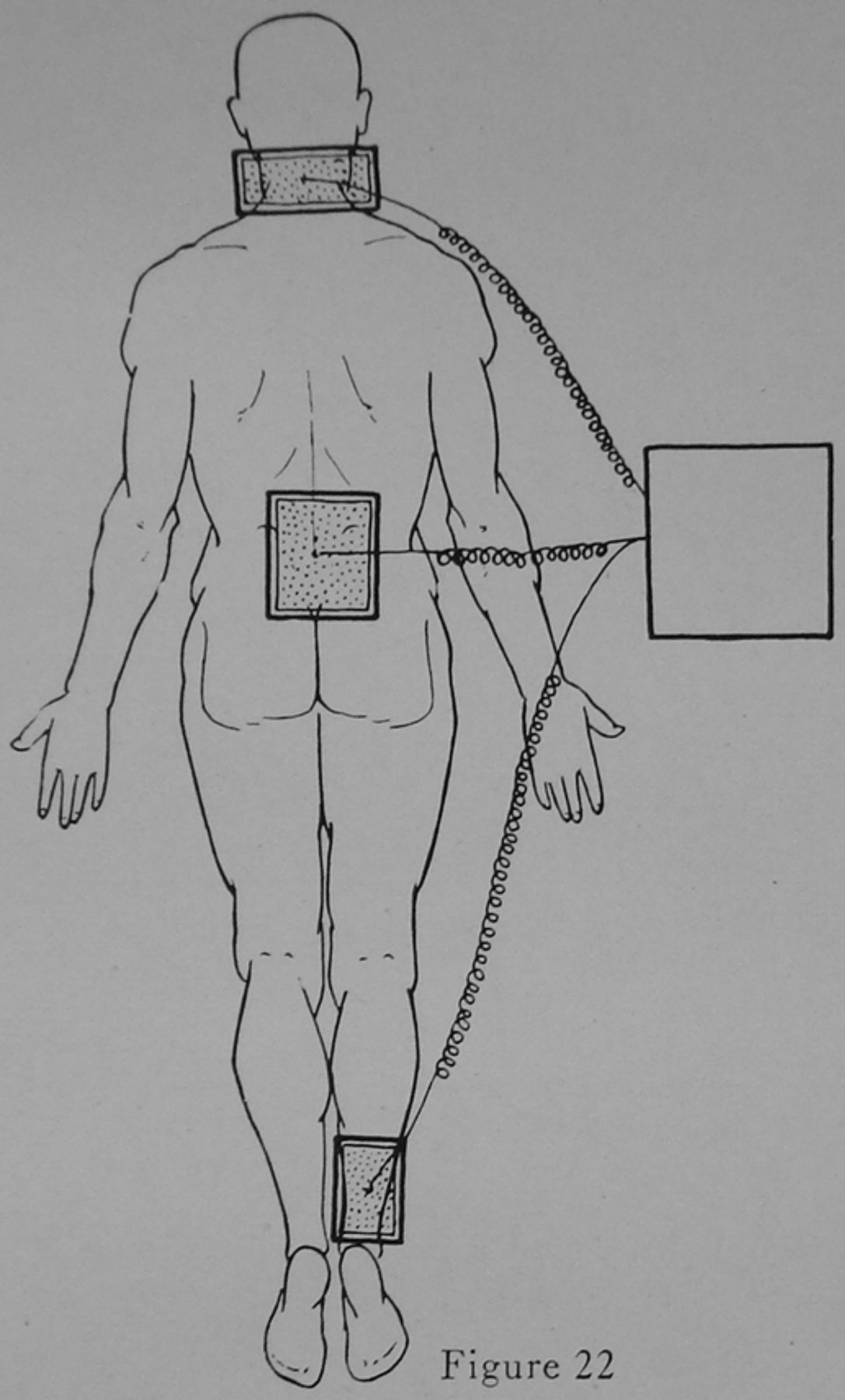


Figure 22

Technic: Non-Surging Galvanic Current.

Surface electrode 3 x 9 at occiput. Positive pole.
Surface electrode 5 x 8 over solar plexus. Negative pole.
Current strength not over 3 M. A.
Time of treatment, 5 to 10 minutes.
Frequency of treatment, daily or as often as required.

If the whole head needs treatment, as is advised in migraine or supra-orbital pain, moisten the scalp thoroughly and interpose a flat sponge, absorbent cotton, chamois, or some other flexible material that will act as a good conductor and conform to the head better than the flat electrode.

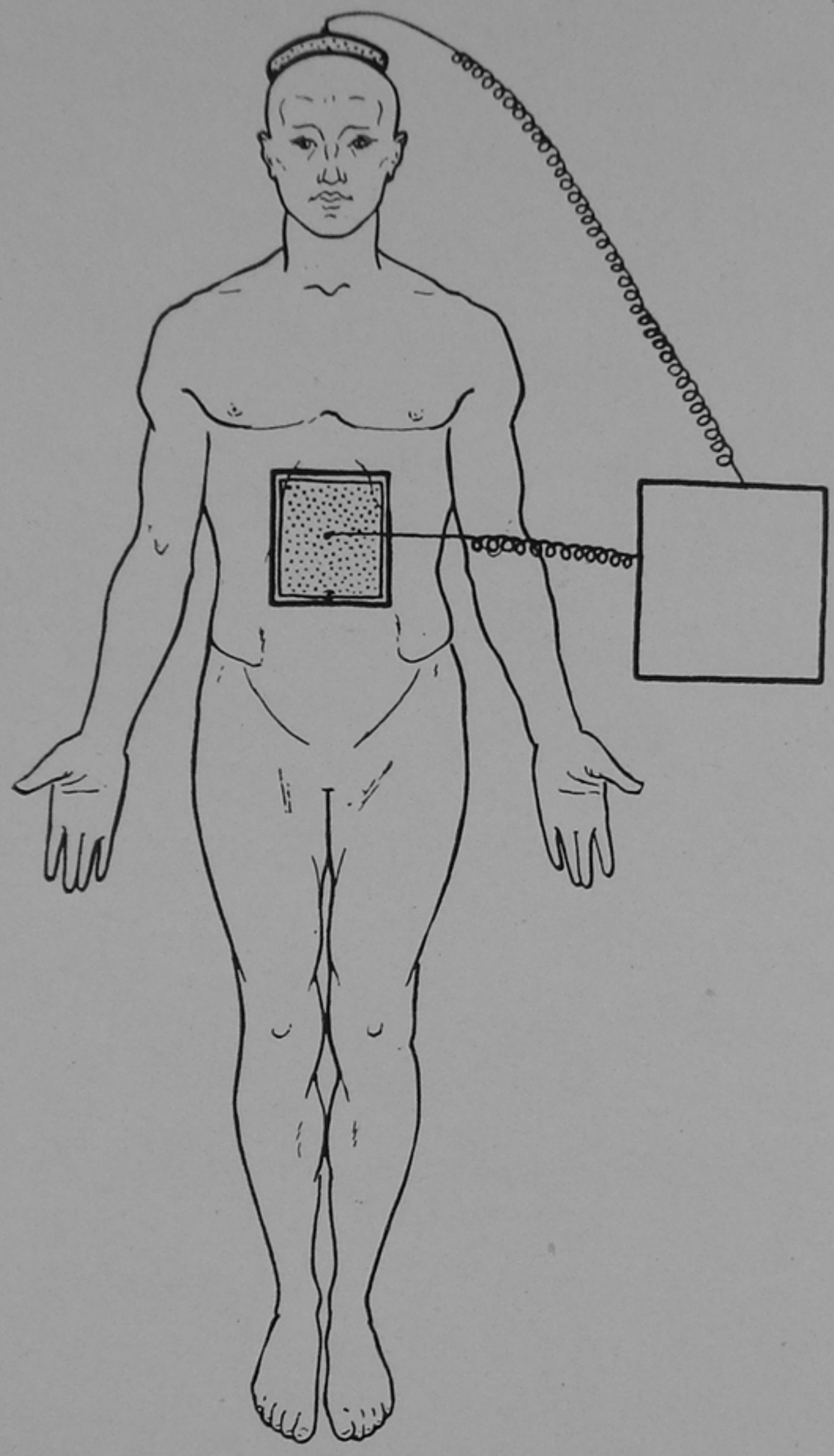


Figure 23

Technic: Non-Surging Galvanic Current.

Electrode above described to the head. Positive pole.

Surface electrode 5 x 8 over solar plexus. Negative pole.

Current strength not over 3 M. A.

Time of treatment, 5 to 10 minutes.

Frequency of treatment, daily or as often as required.

A second technic indicated in headache from indigestion:

Non-Surging Sine Wave Current.

Surface electrode 4 x 5, between the shoulders.

Surface electrode 3 x 3 over forehead.
Current strength, just strong enough to sense comfortable stimulation without dizziness.
Time of treatment, 5 to 10 minutes.
Frequency of treatment, daily.

Cervix, Stenosis of

Technic: Non-Surging Galvanic Current.

Use uterine dilators varying from 6 to 20 (French size), the smallest to be used first.
Dilators must be insulated to within $1\frac{1}{2}$ inches of tips.
The dilator is inserted as far as insulation. Negative pole.
Surface electrode 5 x 8 to lower abdomen. Positive pole.
Current strength, 5 to 8 M. A., no more.
Time of treatment, 5 to 10 minutes.

Frequency of treatment, every ten days, using slightly larger dilator each treatment. Never force the dilation. Negative pole will soften the tissue and permit dilator to enter without pressure. Most gratifying results can be accomplished by this method of treatment.

Colitis

Technic: Non-Surging Galvanic Current.

Surface electrode 5 x 8, over descending colon. Negative pole.
Carbon ball electrode, covered with cotton, saturated with 10% soluble iodine (Burnam's) in rectum. Positive pole.
Current strength to toleration.
Time of treatment, 15 to 20 minutes.
Frequency of treatment, daily until relieved, then three times weekly.

It is helpful to precede this treatment by diathermy. Keep the bowels free with warm enemas. 110 degrees is suggested.

Constipation

(*See Intestinal Stasis and Ptosis, Pages 72–86*)

Deafness, Chronic

Technic: Non-Surging Galvanic followed by Surging Sine Wave Current.

Cotton saturated with saline solution, placed in one or both ears, contact made to cotton with metal electrode designed that it may be readily held in place. No metal must touch the ear.

Connect thereto the negative pole of the Non-Surging Galvanic Current.

Surface electrode on neck, or large carbon electrode, covered with cotton, in contact with tongue, or pillars of fauces. Positive pole.

Current strength, $1\frac{1}{2}$ M. A.

Time of treatment, with Non-Surging Galvanic Current, 15 minutes, followed immediately by mild Surging Sine Wave Current, to same electrode in position, using Cam No. 6.

This technic is recommended highly as one of the best which has been advanced for treatment of deafness.

Dysmenorrhea

Unmarried Women

Technic: Non-Surging Galvanic Current.

In dysmenorrhea, the success of the treatment will depend on the accuracy of diagnosis and the cause which may be either ovarian or uterine misplacement, or stenosis of the cervix. Stenosis of the cervix, especially in young and unmarried women, is the most common cause (see the technic for Cervix, Stenosis of, page

63). By carefully following procedure, the use of the Galvanic Current will produce permanent dilation of the cervix. The results obtained by the use of the Galvanic Current are in marked contrast to those obtained by the more common method of forcible dilation under anæsthetics, the result of which is only temporary.

For *other causes* the following technic is suggested.
Technic: Surface electrode 5 x 8 on abdomen. Positive pole.
Surface electrode 4 x 5 on back or with carbon rectal electrode, covered with cotton, in place. Negative pole.
Current strength, 10 to 12 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, apply treatments on two days in succession preceding menstruation, and three times weekly following menstruation.

Married Women

Technic: Non-Surging Galvanic Current.
Vaginal carbon electrode, covered with cotton, in place. Negative pole.
Surface electrode 5 x 8 on abdomen. Positive pole.
Current strength, 10 to 12 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, same as for unmarried women.

If accompanied by stenosis of cervix, treat the cervix, using technic suggested under Cervix, Stenosis of, on page 63.

Endometritis, Acute and Chronic

When accompanied by pain and hemorrhage. The usual method of treatment has included dilation of the cervix, and the use of the curette to remove the vegeta-

tions and granulations. A much more satisfactory method of treatment is presented in the use of galvanism, the electrolytic action of the current destroying the granulations and vegetations. The antiseptic and tonic properties of the negative pole aid materially to accomplish healthy reproduction.

Technic: Non-Surging Galvanic Current.

Amalgamate copper intra-uterine electrode with mercury, placed in position in the uterus and supported so that it does not come in contact with, and is well insulated from, the vaginal walls.
Positive pole.

Surface electrode 5 x 8, well moistened, placed on the lower abdomen. Negative pole.
Current strength, not to exceed 10 M. A.
Time of treatment, 10 minutes, no more.
Turn current clear off, reverse polarity, and advance current to half strength (5 M. A.) for two minutes, in order that tissue may not adhere to internal electrode.
Frequency of treatment, once each week.

Erosions of the Cervix Uteri

Treat first as for endometritis, followed by one of the three technics suggested below:

Technic: Non-Surging Galvanic Current.

(1) Zinc or copper ball electrode placed in position in contact with the surface of the cervix.
Positive pole.
Surface electrode 5 x 8 on abdomen. Negative pole.
Current strength, 5 to 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, every fourth day.

(2) If no zinc or copper ball electrode is at hand, use carbon ball electrode, covered with cotton, saturated in 2 per cent solution of zinc sulphate. Positive pole.
Surface electrode 5 x 8 on abdomen.
Current strength, 10 to 15 M. A.
Time of treatment, 15 minutes.
Repeat frequency of treatment, same as above.

(3) If erosions bleed easily, always use the copper metal electrode to the cervix. Positive pole.
Technic as above.

Eyelids, Granulated

Technic: Non-Surging Galvanic Current.
A zinc or copper electrode with small tip. Positive pole.
Surface electrode 4 x 5 on back. Negative pole.
Evert the eyelid, holding the positive electrode as one would hold a pencil. Gently rub it over the granulated membrane.
Have assistant gradually turn on the current until 1 M. A. is reached.
Time of treatment, until granules are coated a greenish gray.
Frequency of treatment, once each four or five days.

Eye Strain

Technic: Non-Surging Galvanic Current.
Moist gauze pad placed over the eyes. Negative pole.
Surface electrode 4x5 on the back. Positive pole.
Current strength, 2 to 3 M. A.
Time of treatment, 5 minutes.
Frequency of treatment, twice each week.

Fibroma (Warts and Moles)

Technic: Non-Surging Galvanic Current.

Surface electrode 5 x 8 is placed on the patient's lap, hands placed in contact with it. Positive pole. Negative pole is attached to the smallest size half curved surgical needle, mounted in an insulated needle holder.

Point is inserted at one side of the base of the fibroma, transfixing it just above and parallel with the skin surface.

Current strength, 1 or 2 M. A., being increased to 3 or 4 M. A., as treatment progresses, governed somewhat by sensation. The larger the mole, the less sensitive it is. When a pearly distension of the mole appears, indicating imprisoned hydrogen bubbles, the patient's hands are raised from the pad, and the operator inserts the needle in another place, parallel to the first. This procedure is repeated until the whole mole is soft and swollen, and shows a sharp line of demarcation between the soft tissue and healthy skin. The crust is then washed with alcohol and allowed to dry, the patient permitting the scab to drop off. If scab is removed before it is ready to drop off, a scar will result.

Flat Foot

Technic: Non-Surging Pulsating Direct Current.

Surface electrode 4 x 5 inner side of knee over tibialis anticus. Positive pole.

Surface electrode 3 x 3 at inner curve of arch. Negative pole.

Current strength, 8 M. A.

Time of treatment, 10 minutes.

Each treatment with the Non-Surging Pulsating Direct Current is to be followed by:

Technic: Surging Sine Wave Current.
Surface electrode 4 x 5, placed to inner side of the knee over tibialis anticus.
Surface electrode 3 x 3, placed at the inner curve of the arch.
Cam No. 7 or No. 8.
Current strength, sufficient to produce tolerable contractions.
Time of treatment, 5 minutes first, but increasing gradually to 10 minutes.
Frequency of treatment, three times weekly.

Goitre, Adolescent

The treatment of adolescent goitre differs from that of cystic goitre and usually causes shrinkage.
Technic: Non-Surging Galvanic Current.
Surface electrode 5 x 8 on the back between the shoulders. Positive.
Surface electrodes 3 x 3, well saturated with warm water, to which has been added a saturated solution of potassium iodide. Negative.
Current strength, 5 to 7 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, three times weekly.

Iritis

Technic: Non-Surging Galvanic Current.
Surface electrode 4 x 5 on back of neck. Negative pole.
Gauze pad, well saturated, placed over closed eyelid. Positive pole.
Current strength, 2 to 3 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, every day for three days, then alternate days.

Hemorrhoids

Figure 24 illustrates the carbon ball electrode inserted in the rectum for the treatment of hemorrhoids. Carbon electrodes may be obtained in three sizes, in order that a small size may be inserted in the beginning and be followed by the larger sizes, as treatment of the case progresses.

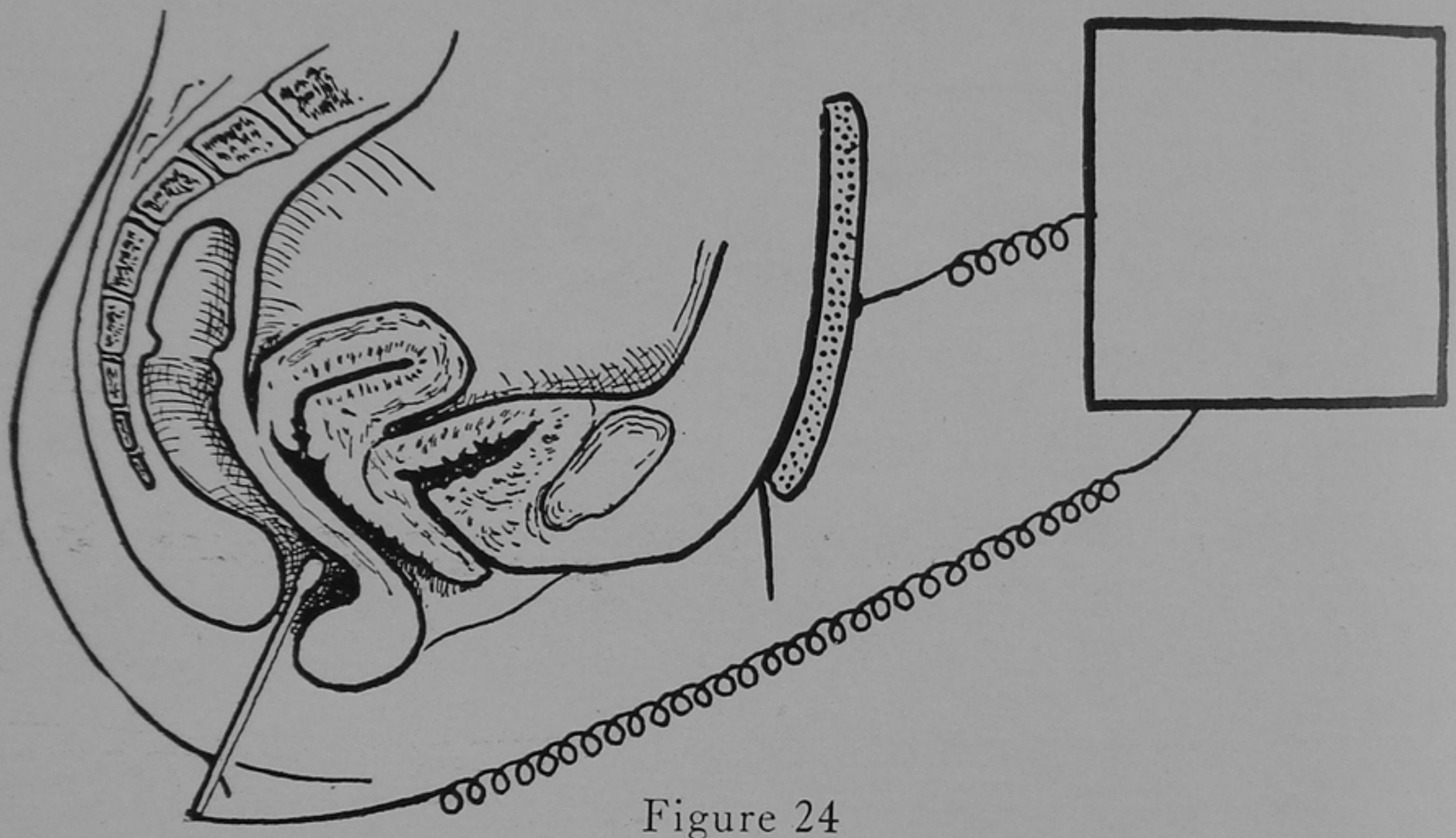


Figure 24

Technic: Bleeding Hemorrhoids — Non-Surging Galvanic Current.
Surface electrode 5 x 8 placed on the abdomen.
Negative pole.
Covered carbon ball electrode placed in position, as illustrated in the cut. Positive pole.
Current strength, 5 M. A.
Time of treatment, 5 minutes.
Frequency of treatment, twice weekly.

Technic: Non-Bleeding Hemorrhoids — Non-Surging Galvanic Current.
Surface electrode 5 x 8 placed on abdomen or back.
Negative pole.
Platinum or gold needle in needle holder. Positive pole.

Insert needle at the anterior extremity of the hemorrhoid passing midway between the base and the middle of the varicosity toward but not through the posterior wall. The needle should be insulated with shellac at a proper distance from the operating surface so as to allow the insulated portion to penetrate the hemorrhoid sufficiently to prevent destructive action on the external mucosa.
Current strength, 2 M. A.
Time of treatment, 8 minutes.
Frequency of treatment, three times weekly.

Herpes Zoster

Technic: Ultra Violet Radiation.
For neuritis following, use
Technic: Non-Surging Galvanic Current.
Surface electrode over the affected area, saturated in 1 per cent sodium salicylate. Negative pole.
Surface electrode placed over emergence of affected nerve. Positive pole.
Current strength, 5 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, daily.

Hypertrichosis, Superfluous Hair

Technic: Non-Surging Galvanic Current.
Surface electrode 4 x 5 under patient's hand. Positive pole.
Attach Hayes' bulbous pointed steel needle in needle holder. Negative pole.
Current strength, $\frac{1}{4}$ to 1 M. A. on each follicle.
Time of treatment, 5 to 15 seconds.
The current should be adjusted before treatment is begun by placing needle on surface electrode. The meter

reading will be slightly higher than during treatment. After adjusting current, place surface electrode on table and insert the needle to base of follicle. Then have patient place hand slowly upon electrode — thereby closing circuit — bearing down lightly at first, and gradually increasing pressure, until desired current is reached. This procedure gives no unpleasant sensation to patient. The hair should epilate at a touch from the forceps — if not repeat the treatment at once. Generally a bit of froth will appear at the base of the follicle. After hair is removed have patient lift hand slowly from electrode to break circuit before removing needle.

Infantile Uterus

See Uterus Infantile, page 111.

Infantile Paralysis

See Paralysis Infantile, page 100.

Intestinal Stasis and Ptosis

In nearly all cases of colonic distortion, when the transverse colon alone is found sagging, the cause may be traced to ptosis of the stomach. If the stomach is affected and there is no evidence that the digestive tract below fails to function normally, treatment should be confined to the stomach.

Stomach — Dilation and Ptosis of

Technic: Surging Sine Wave Current.
Surface electrode 5 x 8 on spine over nerve supply.
Surface electrode 4 x 5 over stomach.
Cam No. 4.
Current strength to comfortable contraction.
Time of treatment, 10 minutes.
Frequency of treatment, twice weekly.

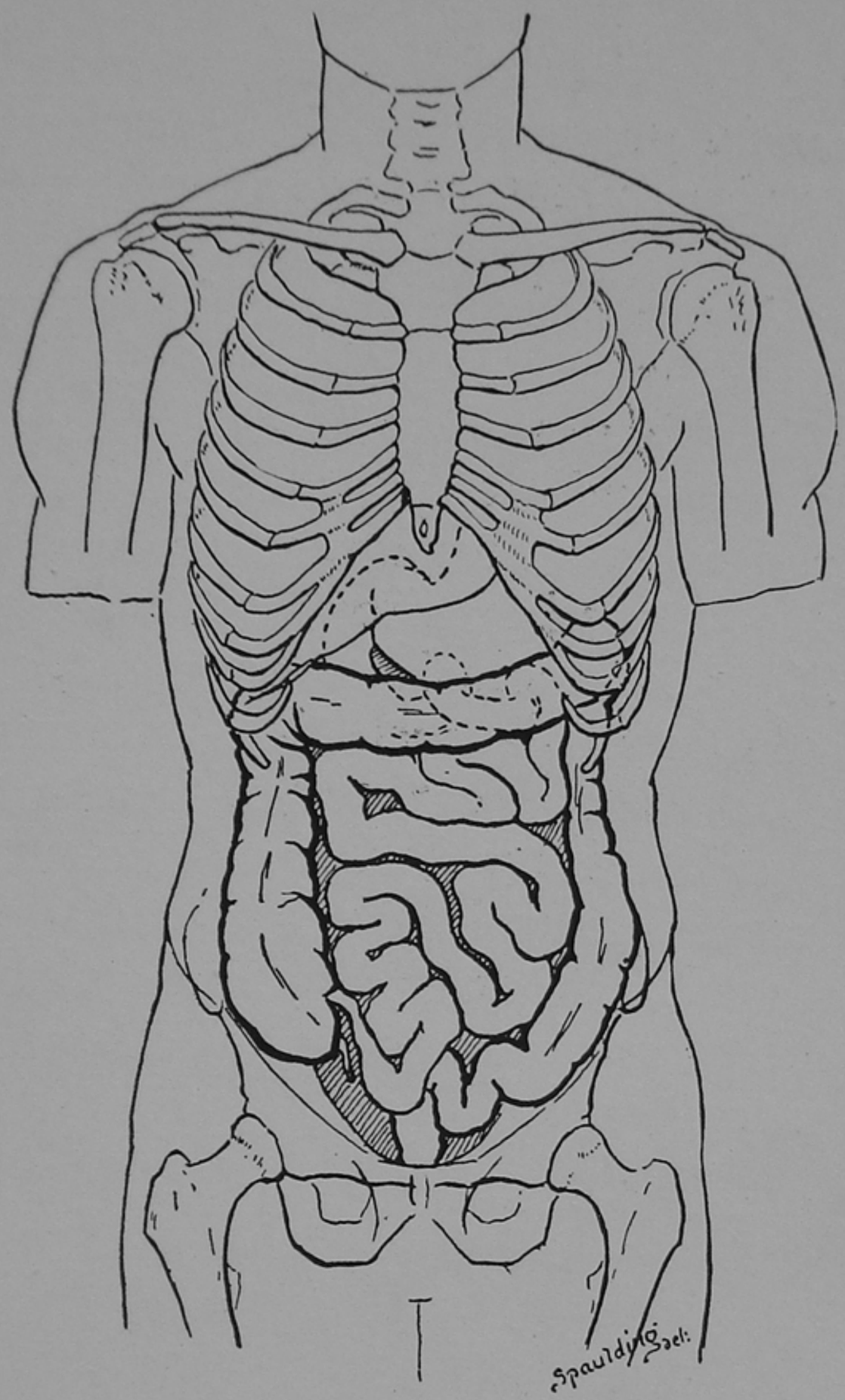


Figure 25

Figure 25 represents the natural position of the stomach, colon and small intestines. Any distortion due to ptosis, a result of muscular inertia, will, in turn, result in angulation, kink, fold or twist. These retard elimination of residue, constitute a foci of infection and possibly a seat for future adhesions, ulcer or cancer where surgery, which usually comes too late, in such cases, must be resorted to.

In the light of present medical knowledge it is always advisable and in many cases most essential that a careful X-Ray study of the region involved be made before deciding on the action to be recommended for relief.

When the function of voluntary muscles becomes impaired, *exercise* proves to be the treatment essentially necessary in order to restore tone strength and function thereto.

The same is true of the gastro-intestinal tract and the muscle structure of the colon itself.

If the patient is not too old, or tubercular, and has no specific disease whereby it would be rendered impossible, complete restoration of normal function can be, and in most cases is, restored.

Figures 26 to 32, inclusive, represent a fair average of cases of colonic stasis, resulting in chronic constipation. These drawings were traced from radiographs of actual cases treated by Dr. Frederick H. Morse, of Boston. A careful examination, including radiographs, was made in each case to make sure of the absence of immovable kinks or obstructions that present positive indication for surgery.

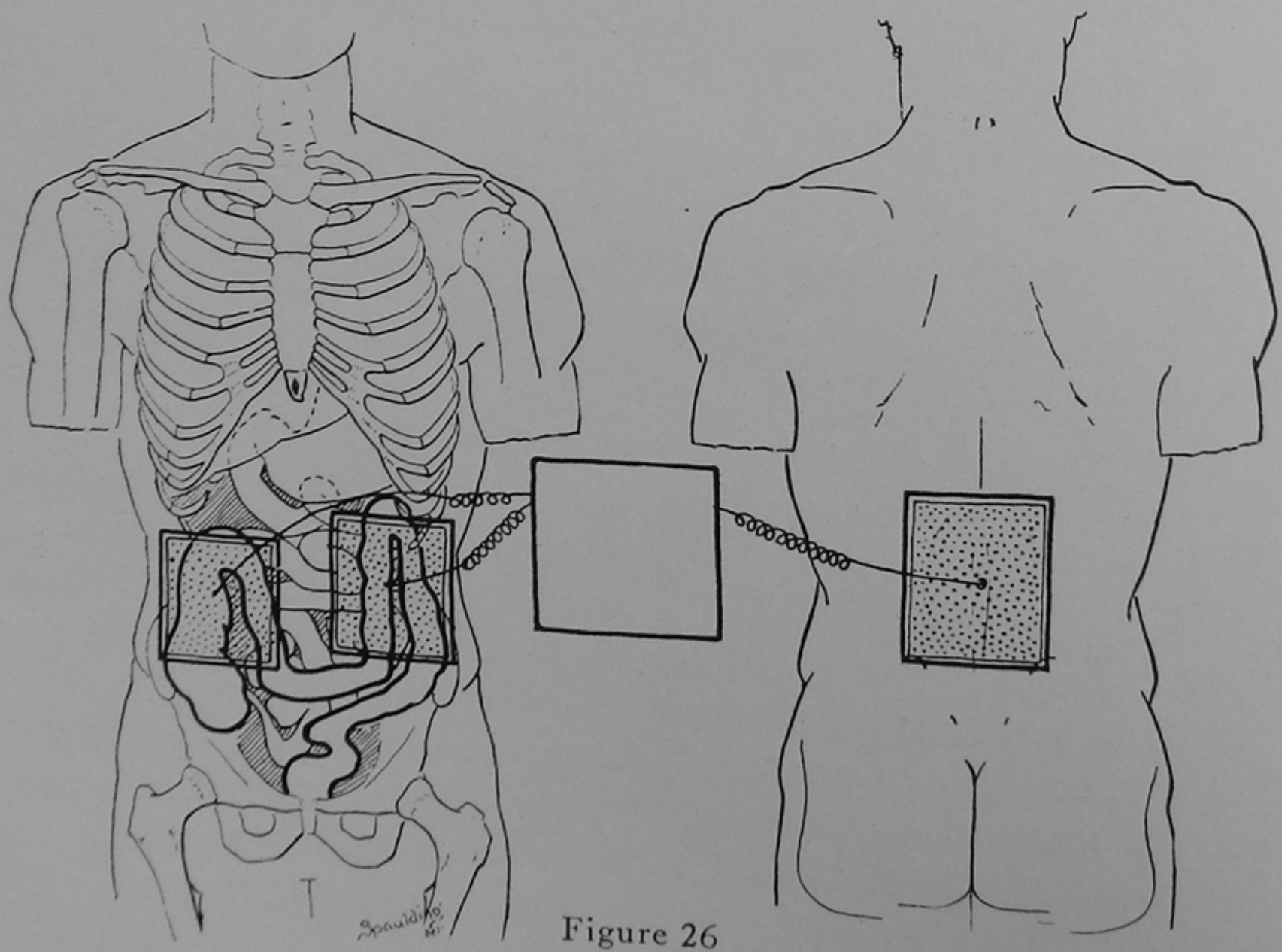


Figure 26

Figure 26 illustrates a marked case of colon prolapsus infringing on the sigmoid and accompanied by a decided prolapse of the stomach. This produced a pronounced inertia, obstinate constipation and infection, resulting in a joint affection (arthritis). This was proven by subsequent treatment to have been caused by toxemia from the colon.

Technic: Surging Sine Wave Current.
Surface electrode 5 x 8 to back.
Surface electrode 4 x 5 to abdomen over area of ptosis of colon and stomach.
Current strength, comfortable toleration.

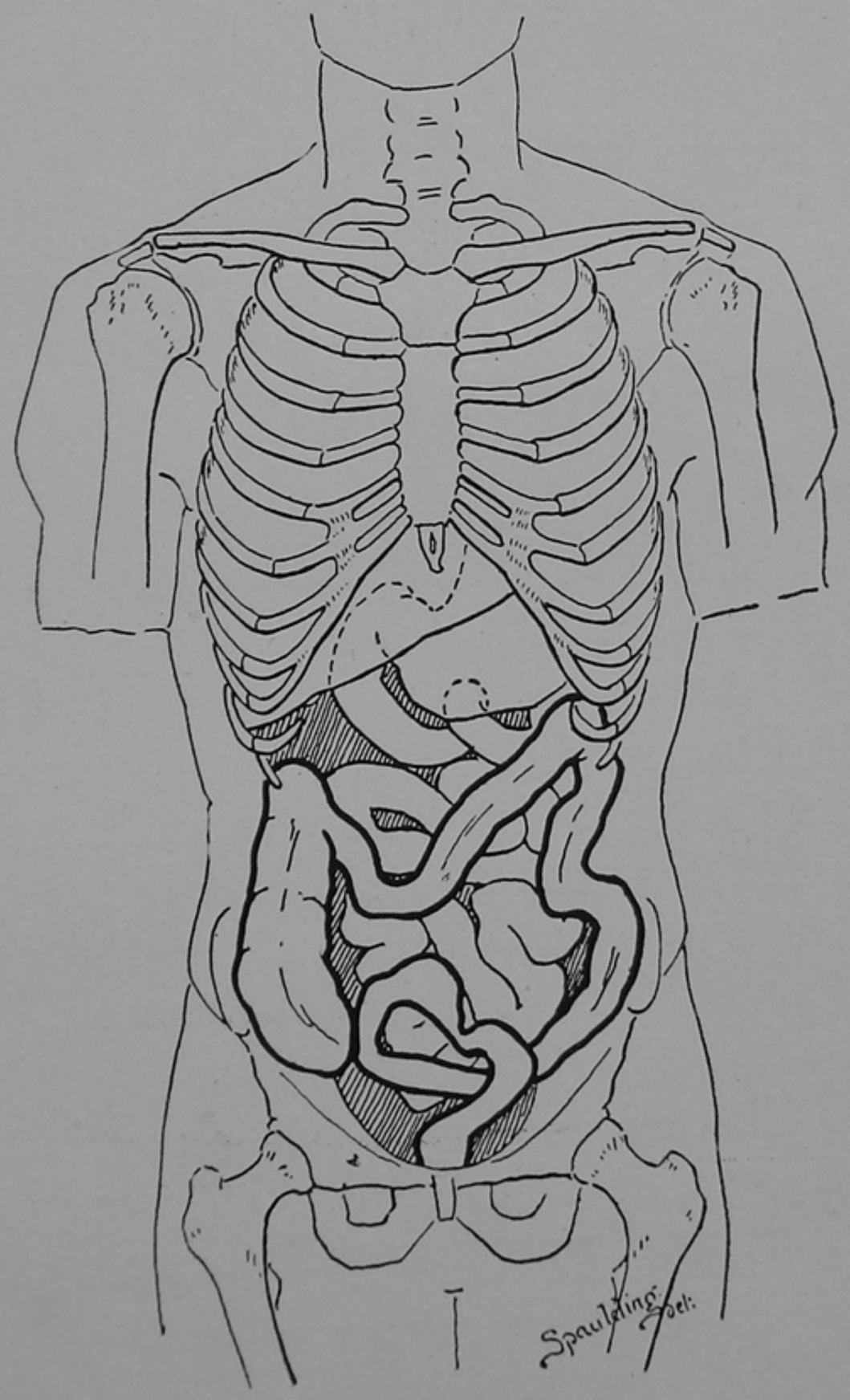


Figure 27

Time of treatment, 15 minutes.
Frequency of treatment, three times weekly.

With twenty-four treatments, laxatives, except mineral oil once daily, were dispensed with and painful symptoms disappeared with no recurrence.

Figure 27 illustrates a slight angulation of the colon at the hepatic flexure, a very marked one at the splenic flexure and well-defined impaction at the sigmoid.

Constipation, the principal symptom in this case, was caused largely by sigmoid distention.

Technic: Surging Sine Wave Current.

Surface electrode 5 x 8 over sixth to twelfth dorsal spine.
Surface electrode 4 x 5 over hepatic flexure.
Cam No. 3.
Current strength, comfortable toleration.
Time of treatment, 10 minutes, followed by
Surface electrode 5 x 8 over abdomen.
Sigmoid electrode in place.
Cam No. 3.
Current strength, comfortable toleration.
Time of treatment, 10 minutes.
Frequency of treatment, three times weekly.

Figure 28 illustrates a distended cæcum with sharp angulation at the splenic flexure with some distortion at the hepatic flexure. The treatment outlined for case illustrated by Figure 26 in a short time relieved the constipation and a backache of long standing, also infectious neuritis from toxæmia.

Figure 29 illustrates a case where peristalsis proved active, yet the patient suffered with recurrent attacks of constipation, and was treated to prevent the three pronounced abnormal curves, then apparent, from becoming dangerous kinks. Good results were quickly manifested.

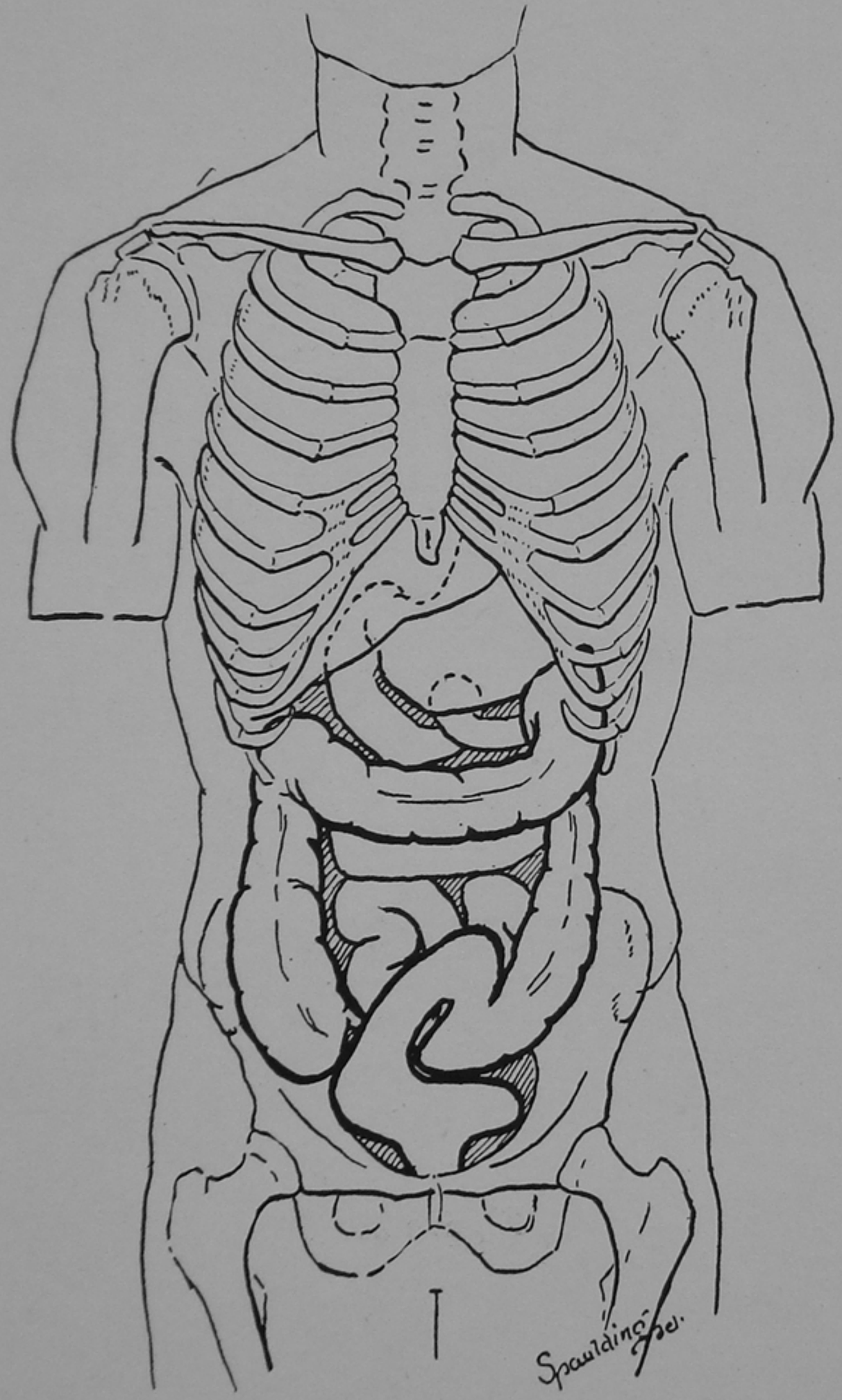


Figure 28

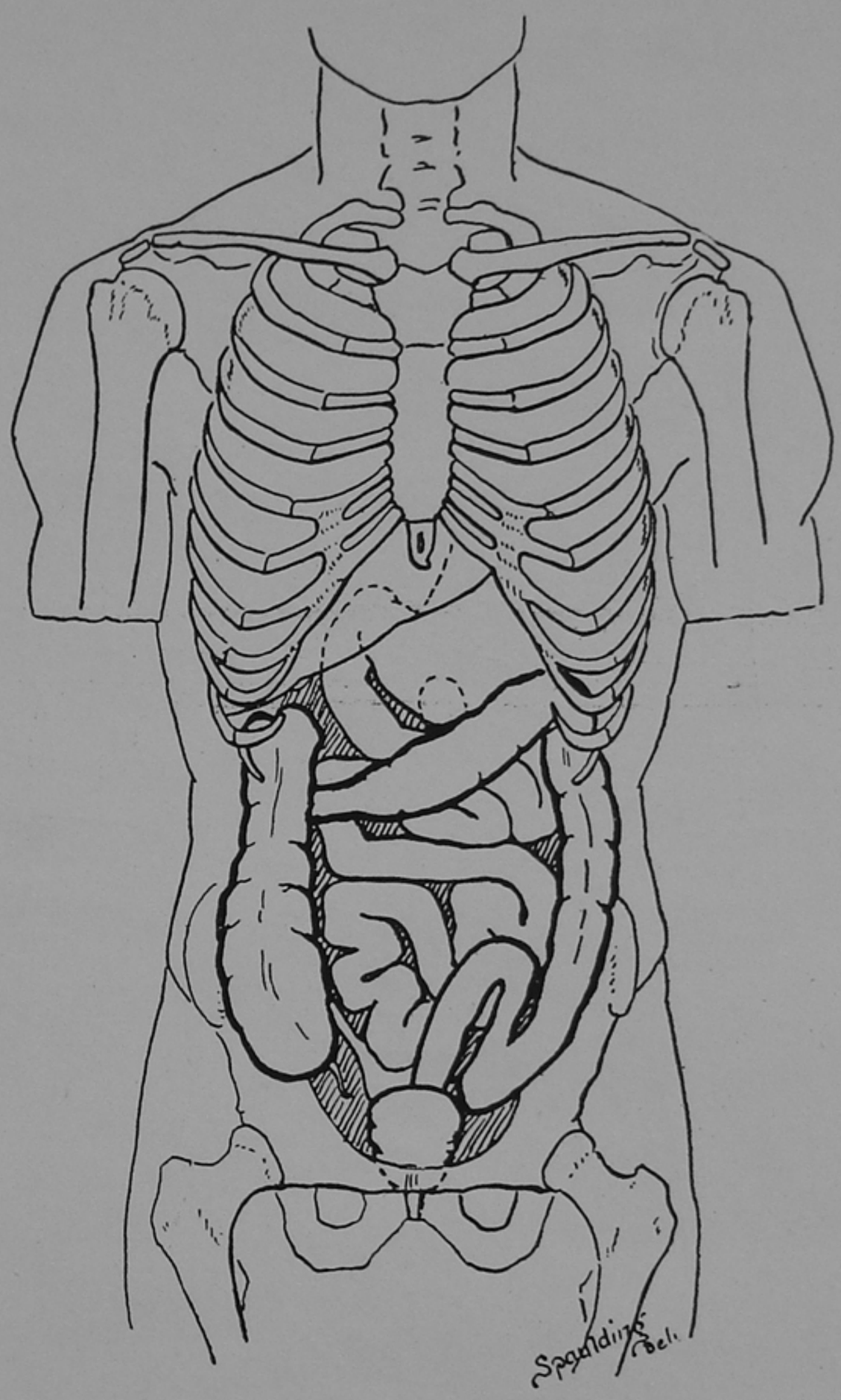


Figure 29

In all cases in which the transverse colon is very low, place a surface electrode 4 x 5 on both sides of abdomen with surface electrode 5 x 8 to the back, high enough to cause the current to pass obliquely from the two abdominal electrodes to the single electrode on the back.

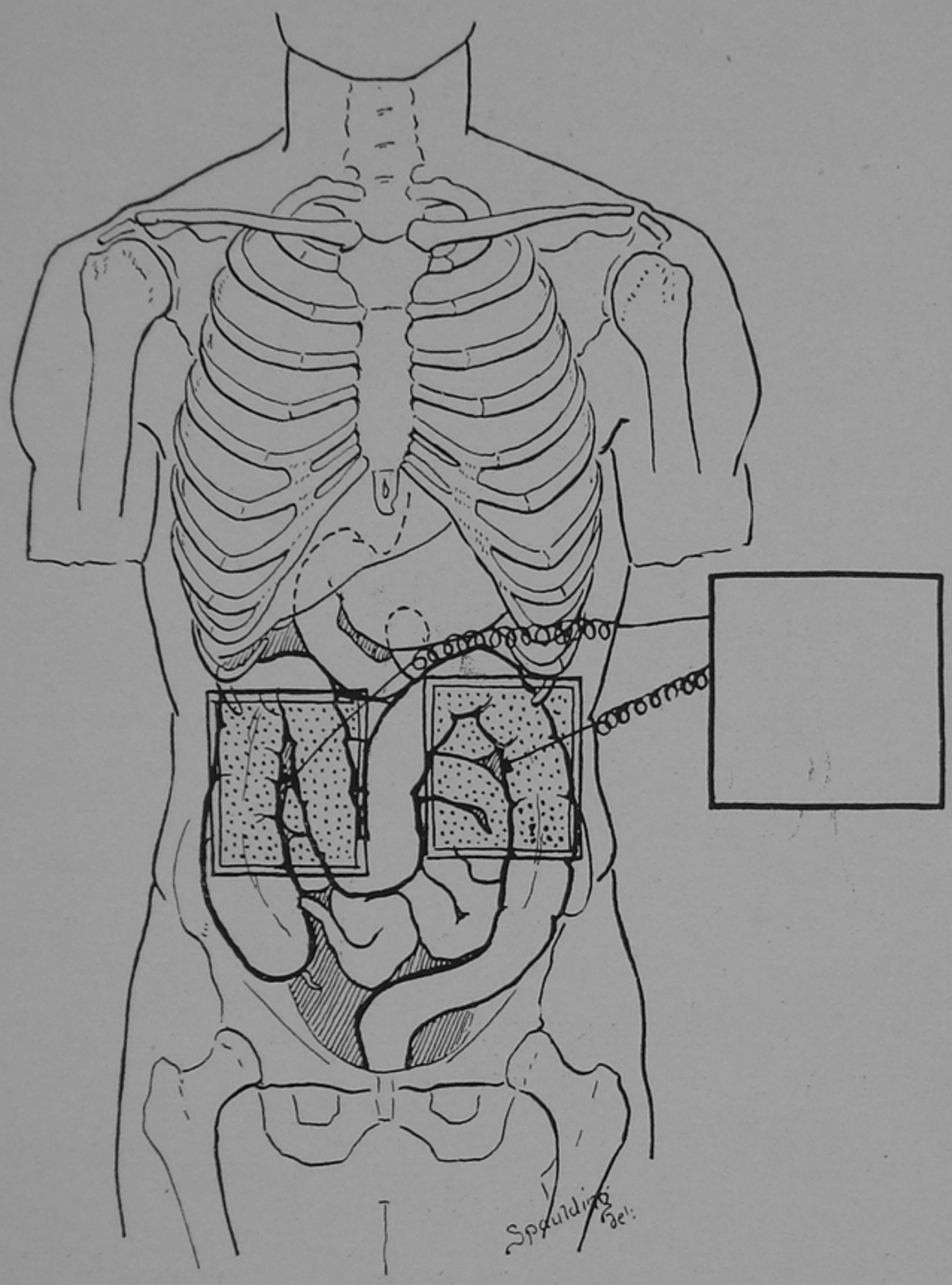


Figure 30

Figure 30 illustrates a marked ptosis of the transverse colon, treated most successfully with electrodes in position as indicated in the cut. In all cases of stomach and colon prolapses the surface electrode 5 x 8 is placed as in Figure 26. One surface electrode 4 x 5 is used on the abdomen, or two may be applied connected together to induce contraction on both sides simultaneously. Electrodes applied to each side separately are preferable.

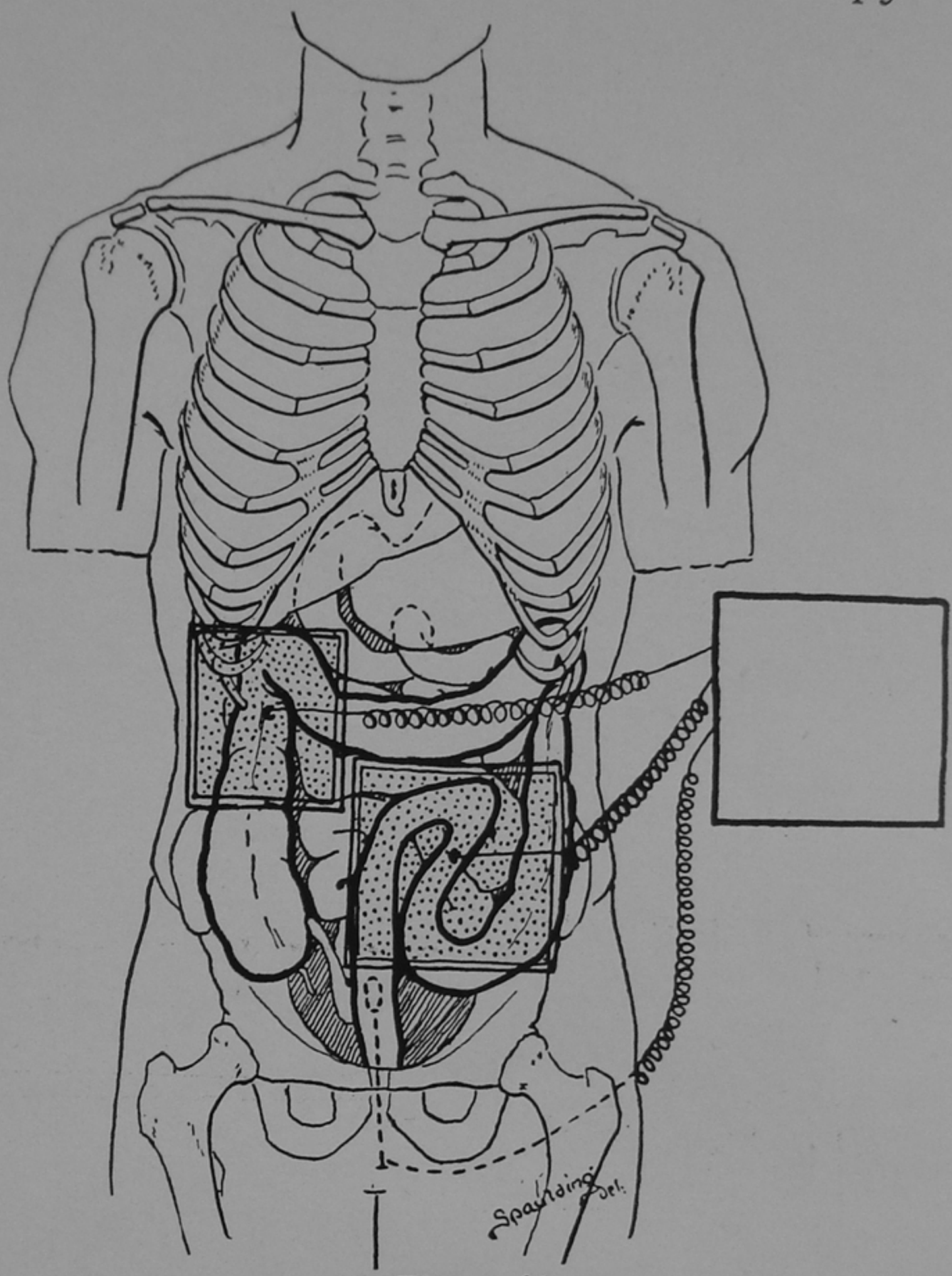


Figure 31

Figure 31 illustrates a case with sharp kink at the hepatic flexure, a distended cæcum, and a prolapse of the transverse colon causing constipation.

Technic: Surging Sine Wave Current.

Two surface electrodes 4 x 5 on abdomen, connected to increase power of contraction.

Sigmoid electrode in place.

Cam No. 3.

Current strength, comfortable toleration.

Time of treatment, 15 minutes.

Frequency of treatment, three times weekly.

If patient has thin abdominal walls and feeble expulsive action, the above technic is especially indicated.

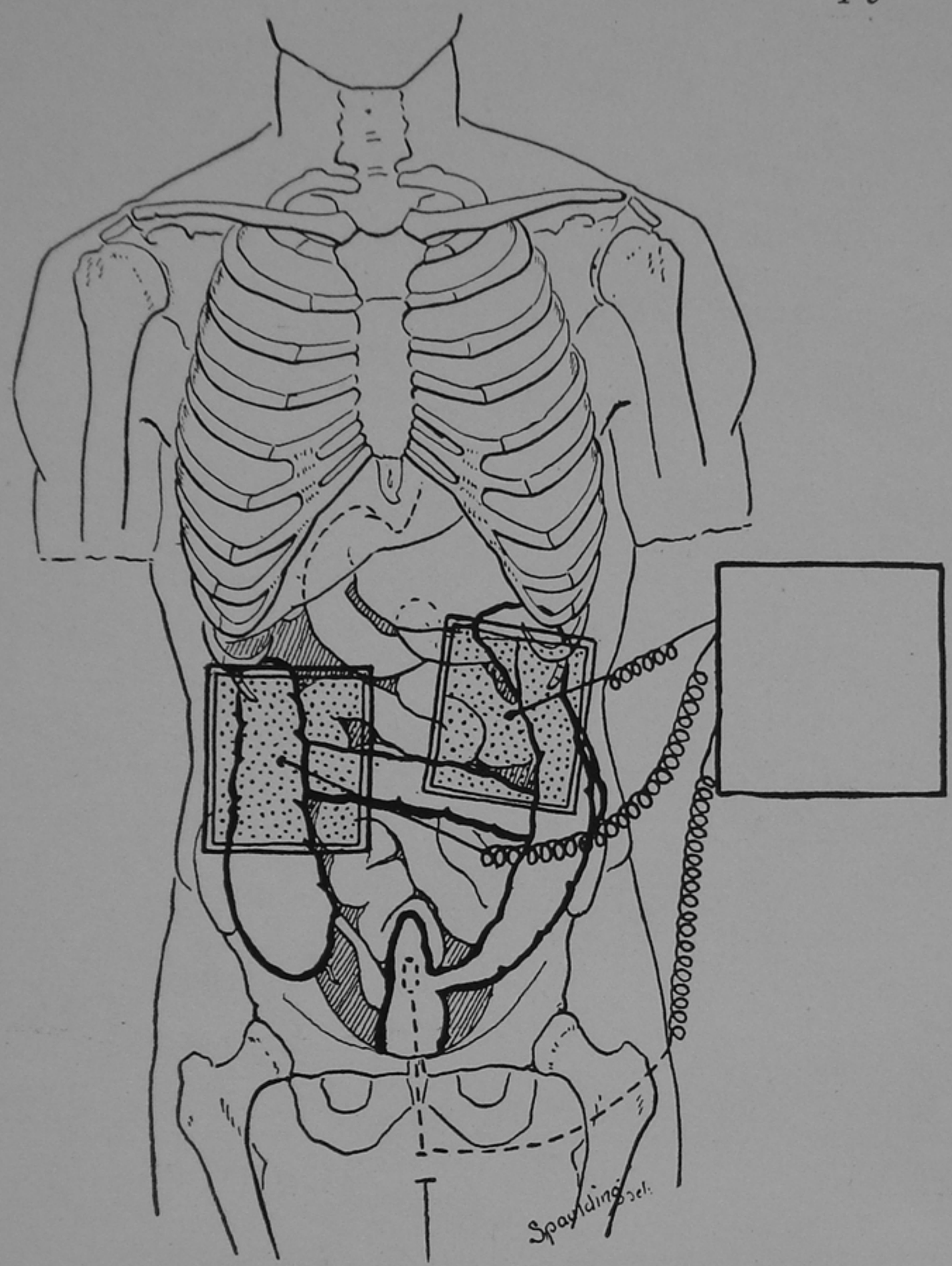


Figure 32

Figure 32 illustrates a marked prolapse of the transverse colon, due to sharp angles at both hepatic and splenic flexures.

Technic: Surging Sine Wave Current.

Surface electrode 5 x 8 to back.

Two surface electrodes 4 x 5, one over each flexure, connected together to pass the current through each flexure to the back.

Cam No. 3 or No. 4.

Current strength, comfortable toleration.

Time of treatment, 15 minutes.

Frequency of treatment, three times weekly.

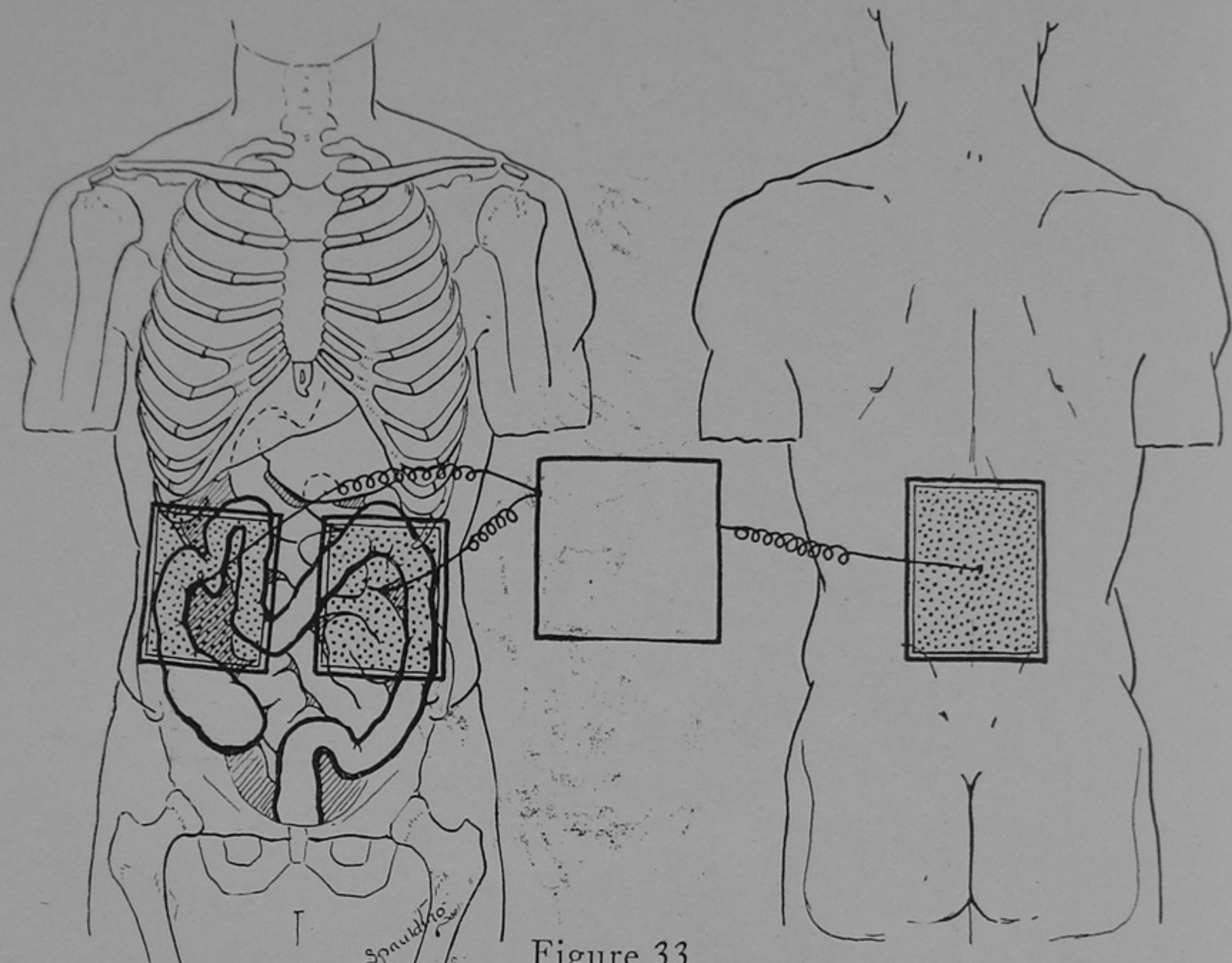


Figure 33

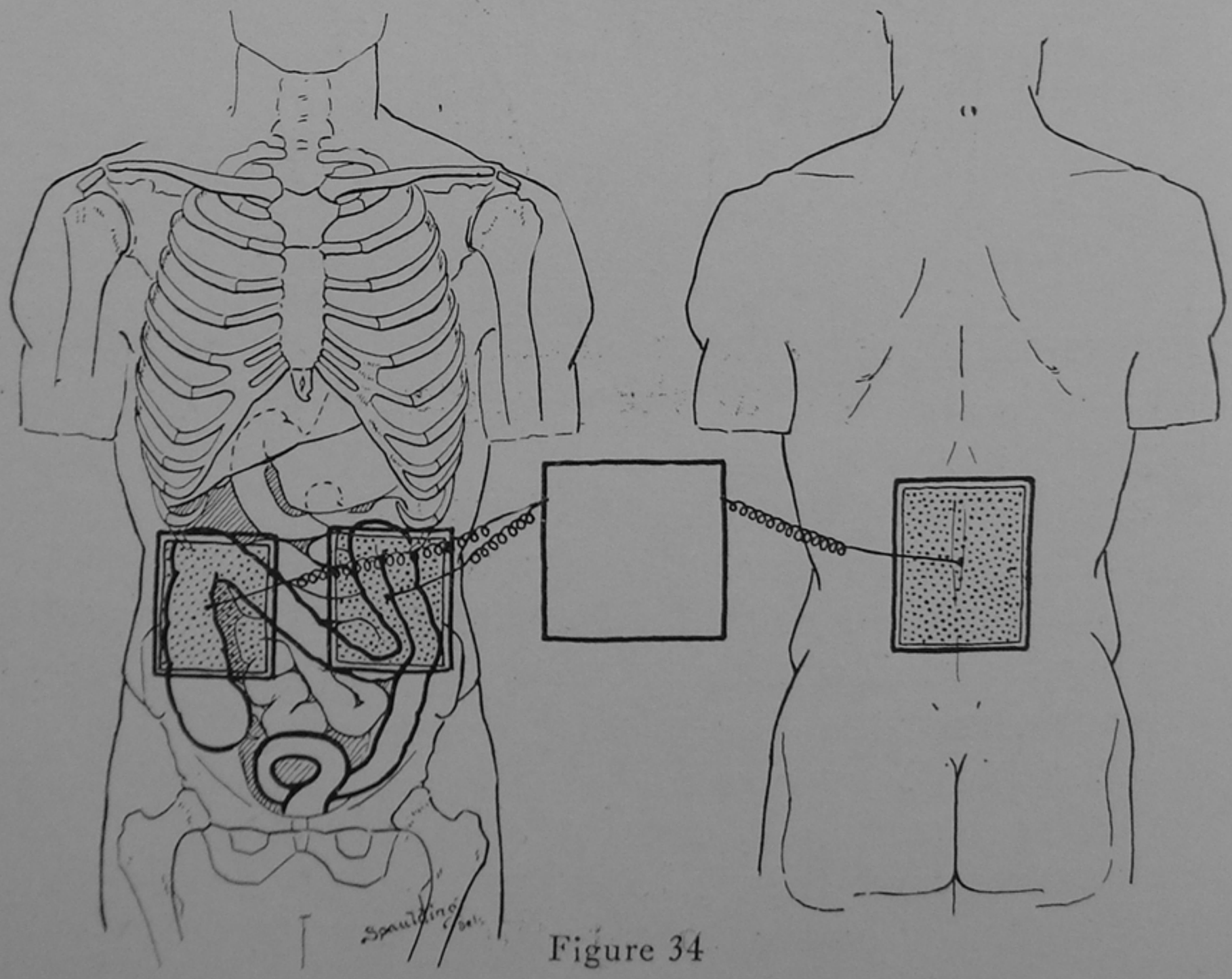


Figure 34

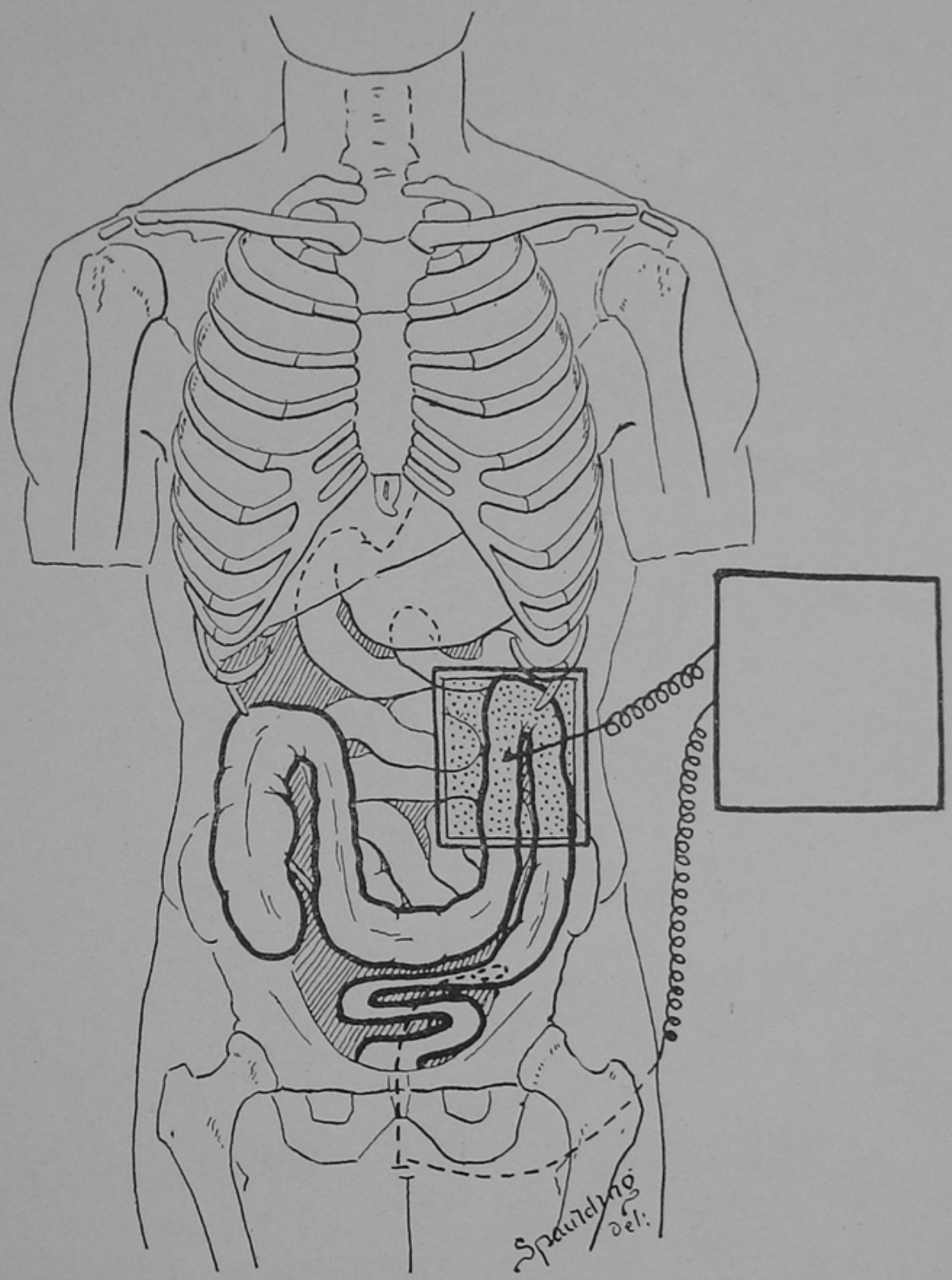


Figure 35

Figures 33, 34, 35 and 36 show a reproduction of actual cases that have been under treatment for intestinal stasis with constipation, and which have been very much or completely relieved. The same general treatment, already described, will apply to these cases. These figures are fair representations of colonic angulations.

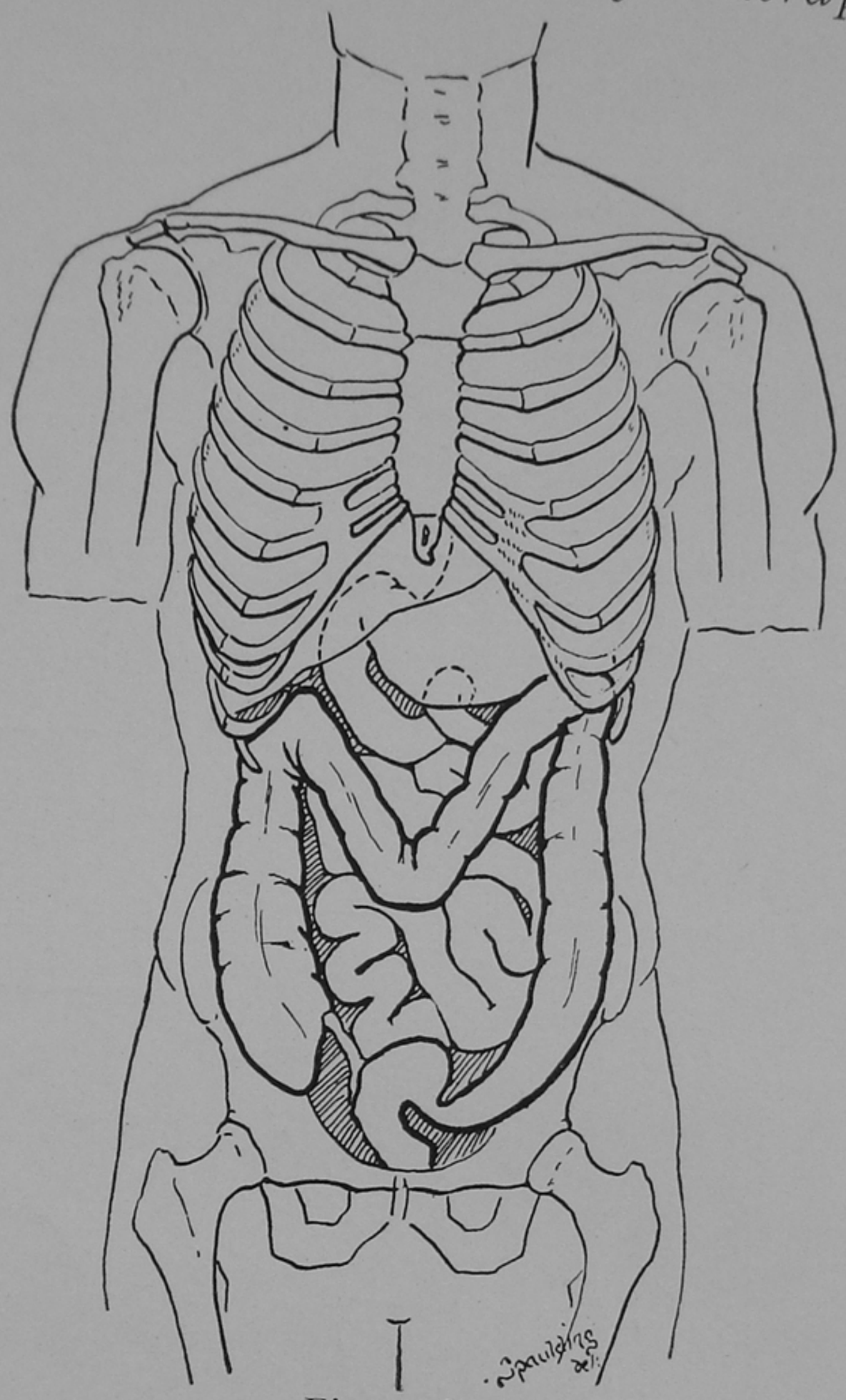


Figure 36

The frequency of applications must depend upon the chronicity of the case and the age of the patient; the more chronic and stubborn the case, the more frequent the treatments should be. Chronic cases should be treated on an average of three times per week, while for less severe cases two treatments a week would be sufficient. Gradually lessen the seances as the results become evident. It is well to remember that in a well-marked case of intestinal toxæmia, if the poison be liberated too rapidly, absorption will be likely to ensue, and a temporary reaction in the form of infectious headache, or possibly some joint disturbance, may occur. Here again good judgment must play its part.



Figure 37

Radiograph above, patient female, age 56.

Suffered from rheumatism, constipation and occasional high blood pressure for a number of years and continually using rheumatic medication and cathartics, having visited a number of physicians during that time. At different times relief had been obtained by strict diet and medical measures, but only to experience recurrence in each instance. Radiograph shows a sharp angulation at the hepatic flexure and well-marked ilial stasis and incompetent ilio-cæcal valve.

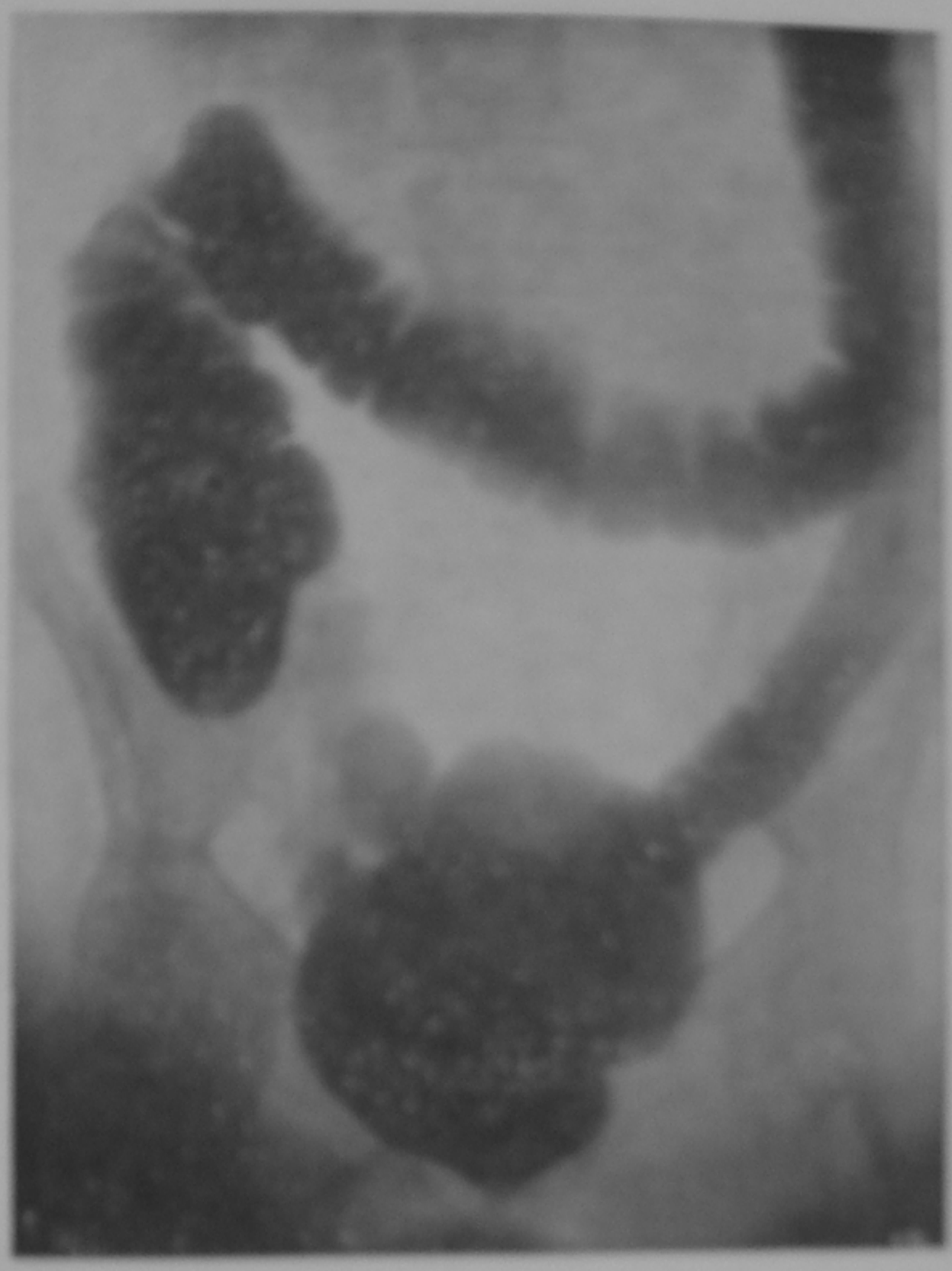


Figure 38

Twenty-six treatments with a surging sine wave current resulted in complete restoration of the defective valve, increased muscle tone of the entire colon, and at the present time constipation, rheumatism and other symptoms are entirely cleared up.

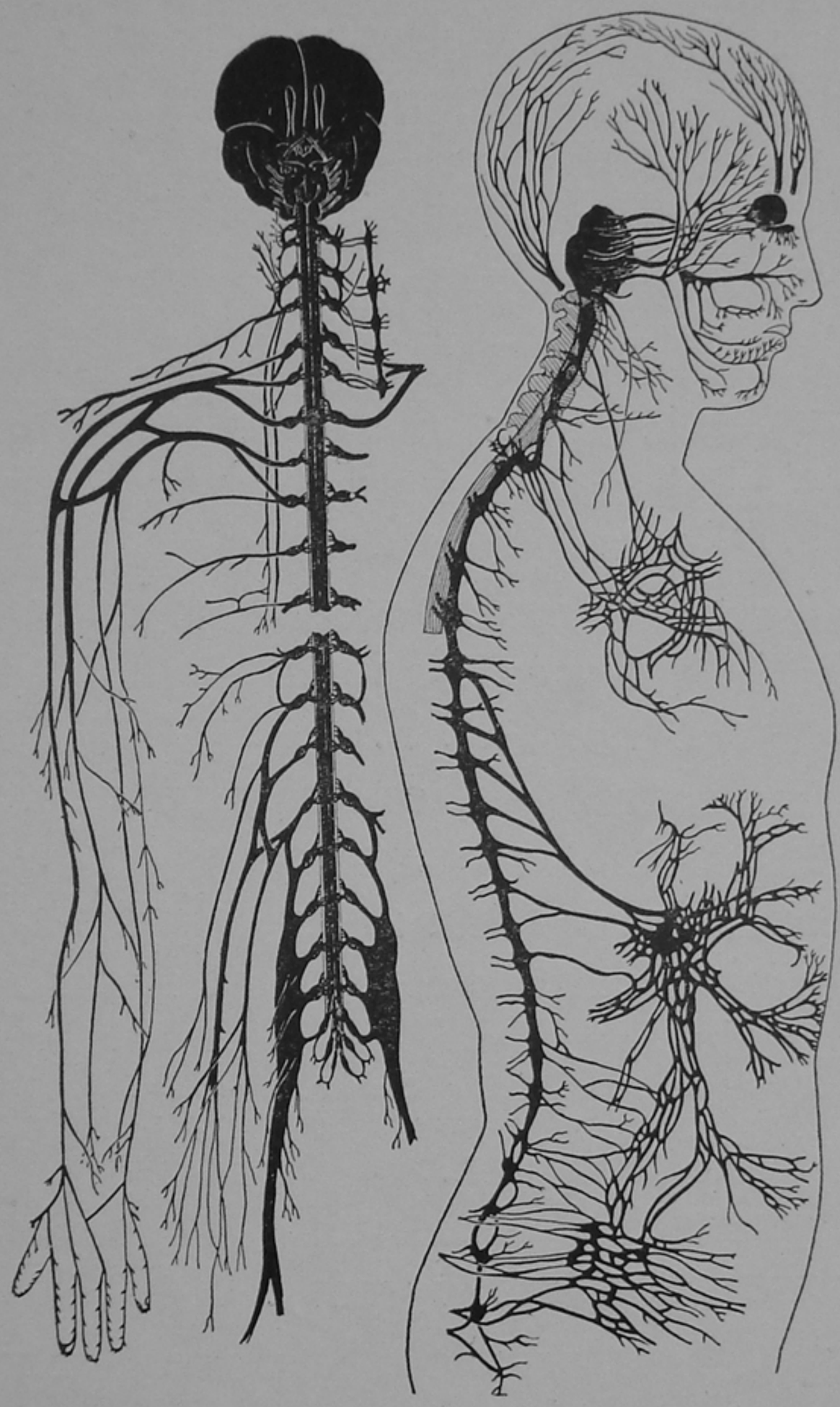


Figure 39

Figure 39 represents the Spinal Nervous System, reference to which enables the physician properly to place the electrode at the back.

Joints, Traumatic

The following treatment is exceedingly valuable in treating stiff joints, such as the elbow, ankle, knee or shoulder, following a fracture or from inactivity due to the application of splint or sling, sprains or bruises.

Elbow

Technic:

(1) If elbow is bent: Surging Sine Wave Current.
Surface electrode 4 x 5 to back over upper dorsal region.
Surface electrode 3 x 3 over back of elbow on insertion of the triceps.
Cam No. 6 or No. 7.
Current strength, enough to forcibly contract extensors and rhythmically straighten arm.
Treat daily as soon after splint is off as possible, beginning cautiously, so as not to rebreak the recent injury.
Time of treatment, 5 minutes, gradually increasing to 15 minutes.
Frequency of treatment, three times weekly (as treatments progress).

(2) If elbow is straight: Surface electrode 4 x 5 on the back.
Surface electrode 3 x 3 on insertion of the biceps.
Cam No. 6 or No. 7.
Strength of current, same as above.
Time of treatment, same as above.
Frequency of treatment, same as above.

Ankle

Technic: Surging Sine Wave Current.
Surface electrode 4 x 5 under the foot.

Surface electrode 3 x 3 on back of leg.
Cam No. 6 or No. 7.
Current strength, sufficient to extend the foot.
Time of treatment, 5 minutes in this position and then change electrode on back of leg, to the insertion of tibialis anticus.
Use same cam as above.
Current strength, same as for elbow.
Time of treatment, same as for elbow.
Frequency of treatment, same as for elbow.

Knee

Technic: Surging Sine Wave Current.
Surface electrodes 3 x 3 on each side of knee.
Cam No. 6.
Current strength, sufficient to deeply massage the joint.
Time of treatment, 3 minutes, then move pads, placing one over and one under the knee. Treat again for 3 minutes, then move pads to one above and one below the knee anteriorly.
Treat again for 3 minutes.
Current strength, same as above.
Frequency of treatment, three times weekly.

Shoulder

Technic: Surging Sine Wave Current.
Surface electrode 3 x 9 between the shoulders on the back.
Surface electrode 4 x 5 to upper arm.
Cam No. 6.
Current strength sufficient to move shoulder joint.
Time of treatment, 10 minutes.
Frequency of treatment, three times weekly.

Leukorrhea

Same technic as Endometritis. See page 65.

Lumbago — Acute and Chronic

Figure No. 40 represents position of surface electrodes in place for the treatment of lumbago.

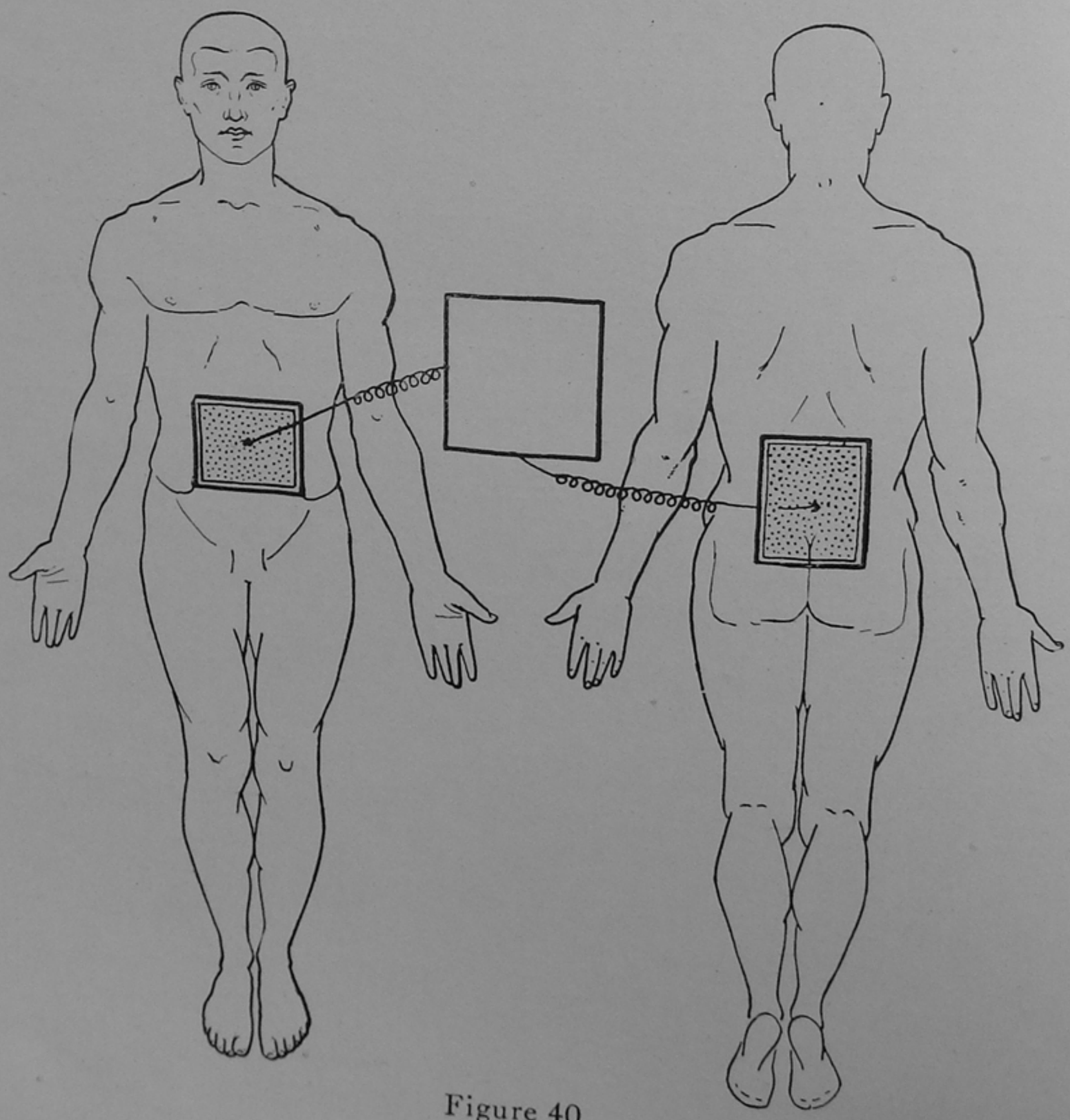


Figure 40

Acute

Technic: Non-Surging Galvanic Current.
Surface electrode 4 x 5 on back over lumbar region. Positive pole.
Surface electrode 5 x 8 on abdomen. Negative pole.
Current strength, 10 to 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, two or three times weekly, as required.

Chronic

Technic: Surface electrode 5 x 8 on abdomen. Positive pole.
Surface electrode 4 x 5 on back. Negative pole.
Current strength, 10 to 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, two or three times weekly.
Follow by Non-Surging Sine Wave Current to comfortable toleration.

Menorrhagia

Technic:
(1) Non-Surging Galvanic Current.
Surface electrode 5 x 8 over abdomen. Negative pole.
Intra-uterine copper electrode inserted in uterus. Positive pole.
Current strength, 10 to 15 M. A.
Time of treatment, 15 minutes.

Reverse polarity before attempting to remove uterine electrode. Turn current off slowly, reverse pole changing switch, turn current on slowly, using half strength used for treatment for two minutes.

Technic:

(2) Surface electrode 5 x 8 on abdomen. Negative pole.
Carbon ball electrode, covered with cotton, inserted into vagina. Positive pole.
Current strength, 10 to 15 M. A.
Time of treatment, 20 to 30 minutes.
Frequency of treatment, twice weekly.

(3) Surface electrode 5 x 8 on abdomen. Positive pole.
Surface electrode 4 x 5 on sacrum. Negative pole.
Current strength, 15 to 20 M. A.
Time of treatment, 30 minutes.
Frequency of treatment, three times weekly.

Nerve Testing for Reaction of Degeneration

(See pages 35 to 45 inclusive)

Neuralgia, Acute

Technic:

(1) Non-Surging Galvanic Current.
Surface electrode 5 x 8 on back or abdomen.
Negative pole.
Surface electrode 4 x 5 over affected area.
Positive pole.
Current strength, gradually increased to 5 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, daily.

(2) Surface electrode 5 x 8 on back or abdomen.
Negative pole.
Pad covered with gauze soaked in 2 per cent quinine bichloride, over painful area. Positive pole.
Current strength, gradually increased to 5 to 8 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, repeat for one or two days, as necessary.

Neuritis, Acute Inflammatory

Technic: Non-Surging Galvanic Current.
Place one surface electrode 4 x 5 above, and one below painful area.
Current strength, 5 to 10 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, three times weekly.

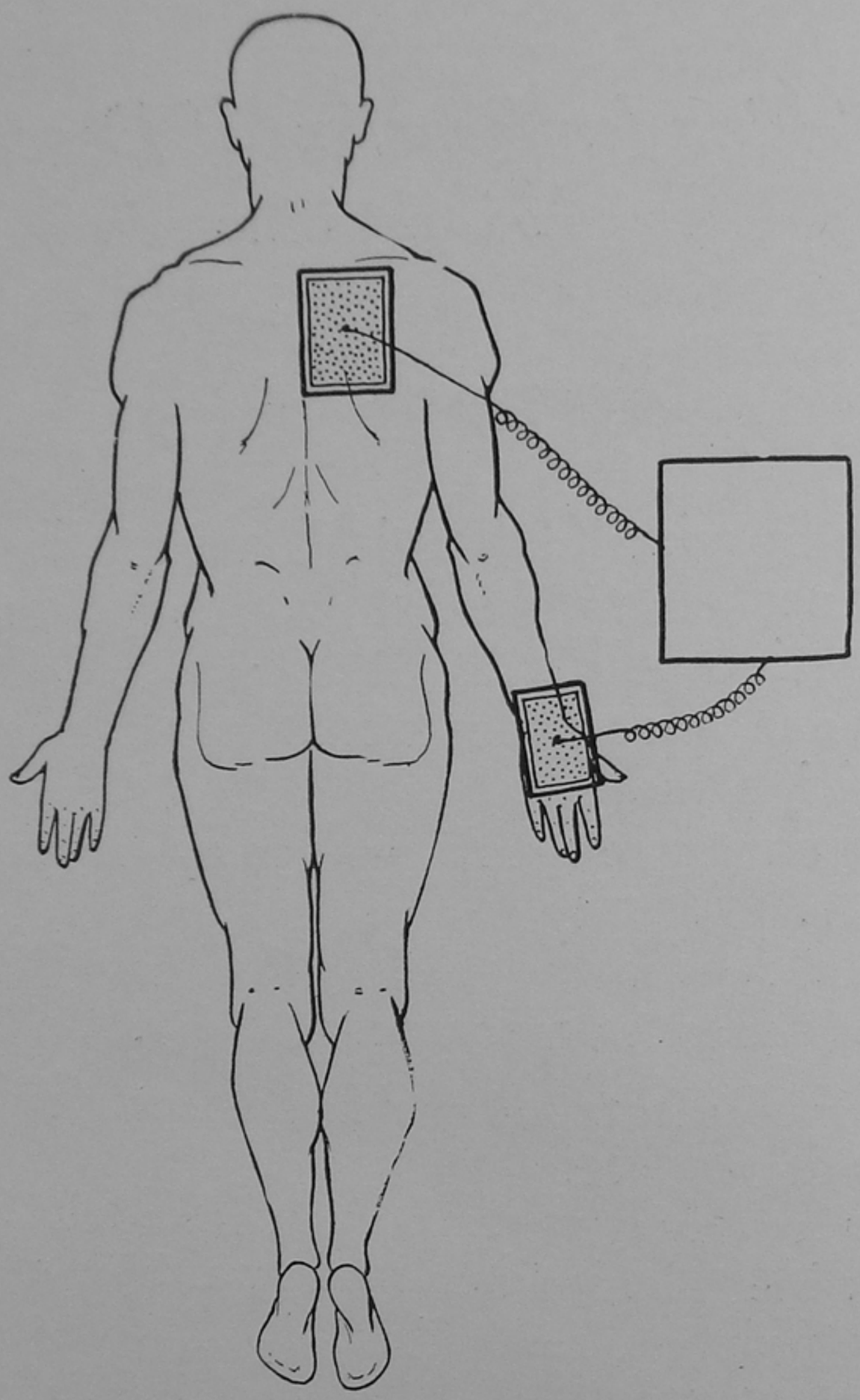


Figure 41

Neuritis, Chronic

Technic: Non-Surging Pulsating Direct Current.
Surface electrode 5 x 8 on back. Positive pole.
Surface electrode 4 x 5 covered with gauze, saturated with 2 per cent sodium salicylate. Negative pole.
Current strength, in back or legs, 10 to 15 M. A.
Current strength, about the head or face, not to exceed 5 M. A.
Time of treatment, 20 minutes.
Frequency of treatment, three times weekly.

Neuritis, Brachial

See Brachial Neuritis, page 58.

Neuritis of Arm

Technic: Non-Surging Galvanic Current.
Surface electrode 5 x 8 over nerve supply on spine.
Positive pole.
Surface electrode 4 x 5 at wrist. Negative pole.
Current strength, 8 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, daily if necessary.

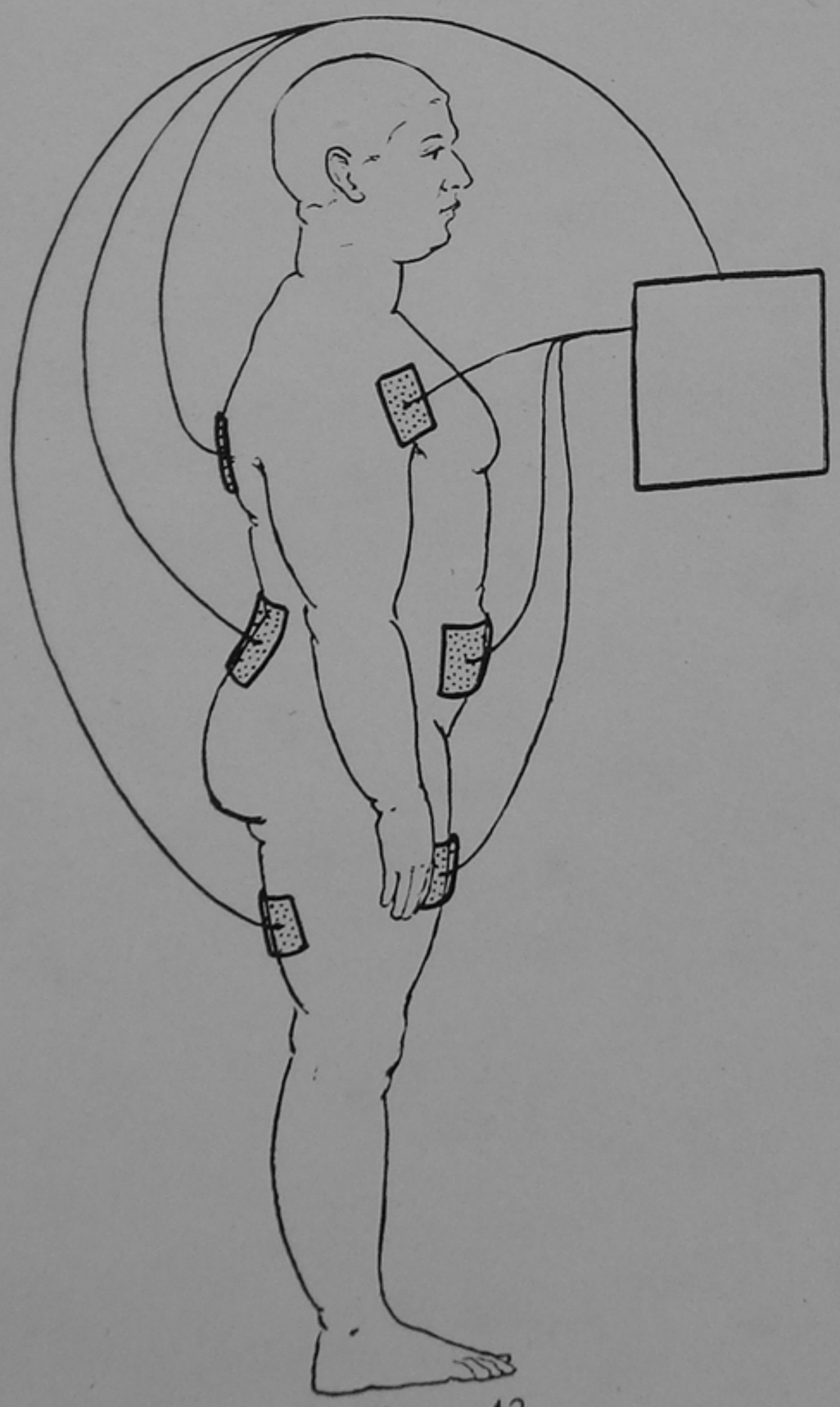


Figure 42

Obesity

Technic: Surging Sine Wave Current.

Apply one, two or more surface electrodes 4 x 5, connected together, on the front with connection to one terminal, and one, two or more electrodes, connected in the same manner, on the back with connection to the other terminal.
Cam No. 2, No. 7 or No. 8, depending on the rapidity of contractions required.
Current strength, to a comfortable toleration.
Time of treatment, 10 to 20 minutes, beginning with short time and increasing each treatment until muscles are accustomed to exercise.
Frequency, three times weekly.

Patient should be prone, with sand bags over each electrode, front or back, in order that the contractile action of muscles may lift a weight consistent with the strength of the patient. Treatment must not be carried to point of fatigue.

Otitis Media

Cleanse the ear with zinc solution prior to treatment.

Technic: Non-Surging Galvanic Current.

Fill the ear with a warm solution of zinc sulphate, 10 grs. to ounce. Insert the hard rubber speculum of a medicine dropper with a zinc wire or narrow strip of metal passed through it as a positive electrode. Be careful to keep the wire just within the insulation, so as to avoid danger of contact with aural tissue.
Surface electrode 4 x 5 on shoulder or arm of side affected. Negative pole.
This avoids possible vertigo by lateral passage of current through the brain.

Current strength, increased gradually to from 2 to 5 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, twice weekly.

Paralysis

In all forms of paralysis, the treatment to be selected depends upon the degree of nerve injury present. The current must pass through the affected muscle or muscles lengthwise, never transversely. A general rule to follow in attaching electrodes is to place one over the spinal nerve supply, which controls the muscles affected, and the other beyond or to the extremity of the disability.

For example: In treating paralysis of the arm, whatever may be the cause, place an electrode on the back, as in Figure 43, over the sixth to eighth dorsal vertebræ, with the other in the palm of the hand or on the wrist. Use the positive pole on the spinal nerve exit in the acute or painful cases.

In chronic cases, apply the negative pole to the spine.

In treating paralysis of the leg, the same general procedure is carried out. To prevent possible fatigue it is undesirable to cause stimulation of paralyzed muscle for a period of over ten minutes.

In treating the average paralyzed area, the Surging Pulsating Direct Current is indicated, as this current causes increase in circulation and nutrition to the nerve and muscle fibers and at the same time causes a contraction and exercise of the muscles simultaneously.

The cam selected should be the one which produces contraction timed to imitate the normal action of the muscles being treated.

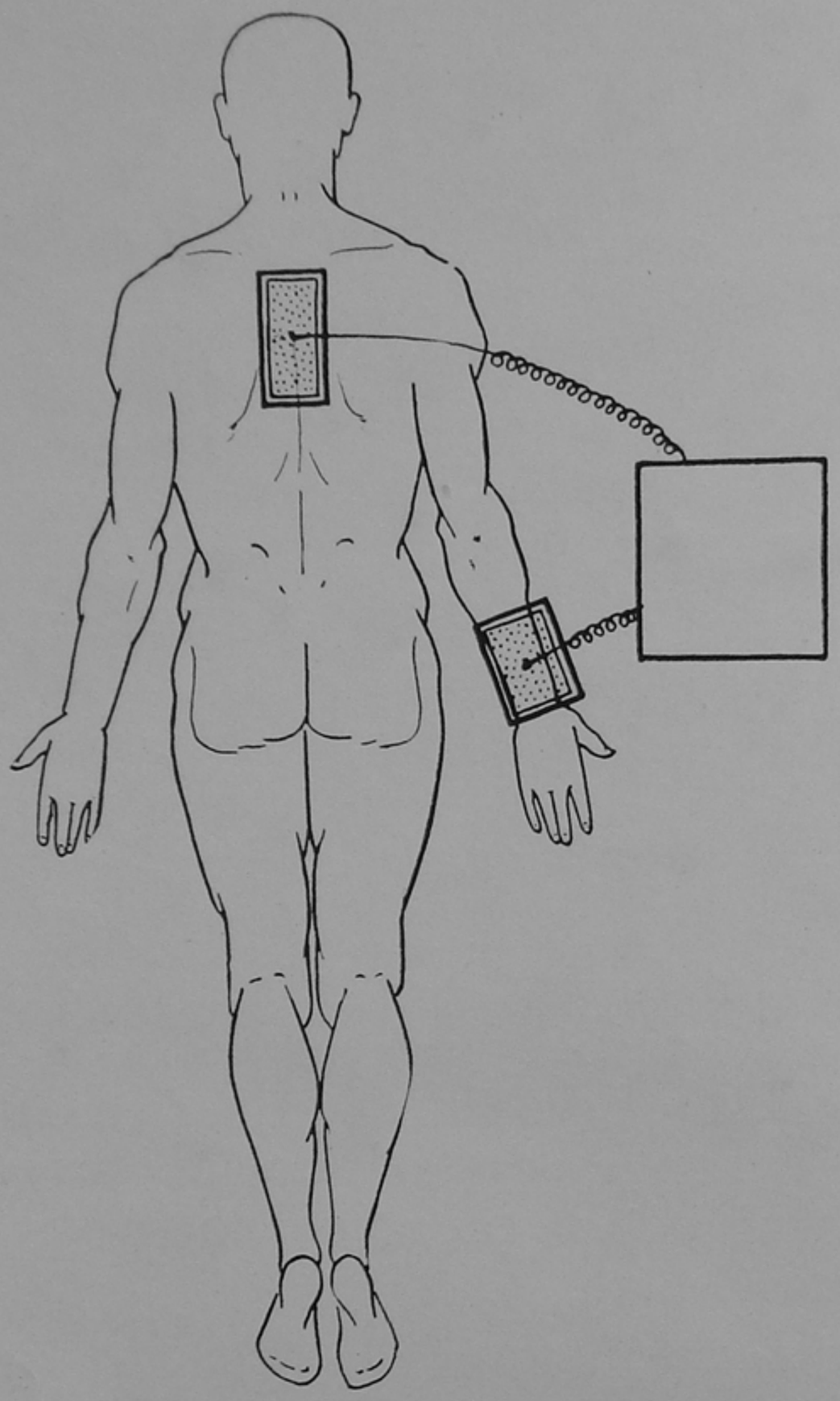


Figure 43

Technic: Surging Pulsating Direct Current.

Surface electrode 3 x 9 over sixth to eighth dorsal vertebræ. Negative pole.

Surface electrode 4 x 5 to palm of hand, first wrapping entire hand with chamois skin saturated with water. Positive pole.

Current strength, 5 to 15 M. A., depending on size of the part and distance between electrodes.

Cam No. 2.

Time of treatment, 10 minutes.

Frequency of treatment, three times weekly.

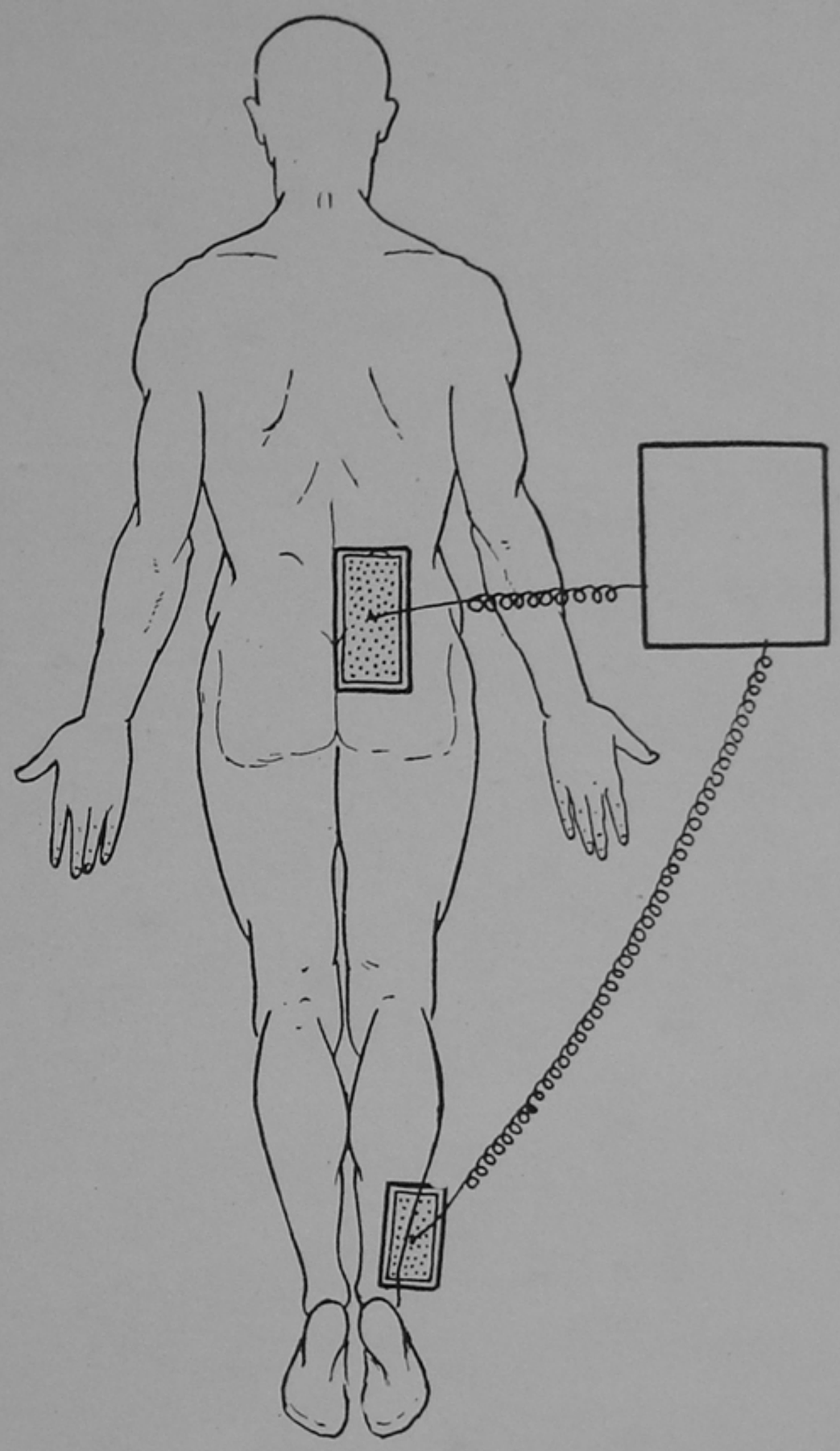


Figure 44

Technic:

In paralysis of the leg, apply the 3 x 9 surface electrode to the lumbar region and the 4 x 5 electrode to the ankle.

Cam No. 5.

Current strength, same as above.

Time of treatment, same as above.

Frequency of treatment, same as above.

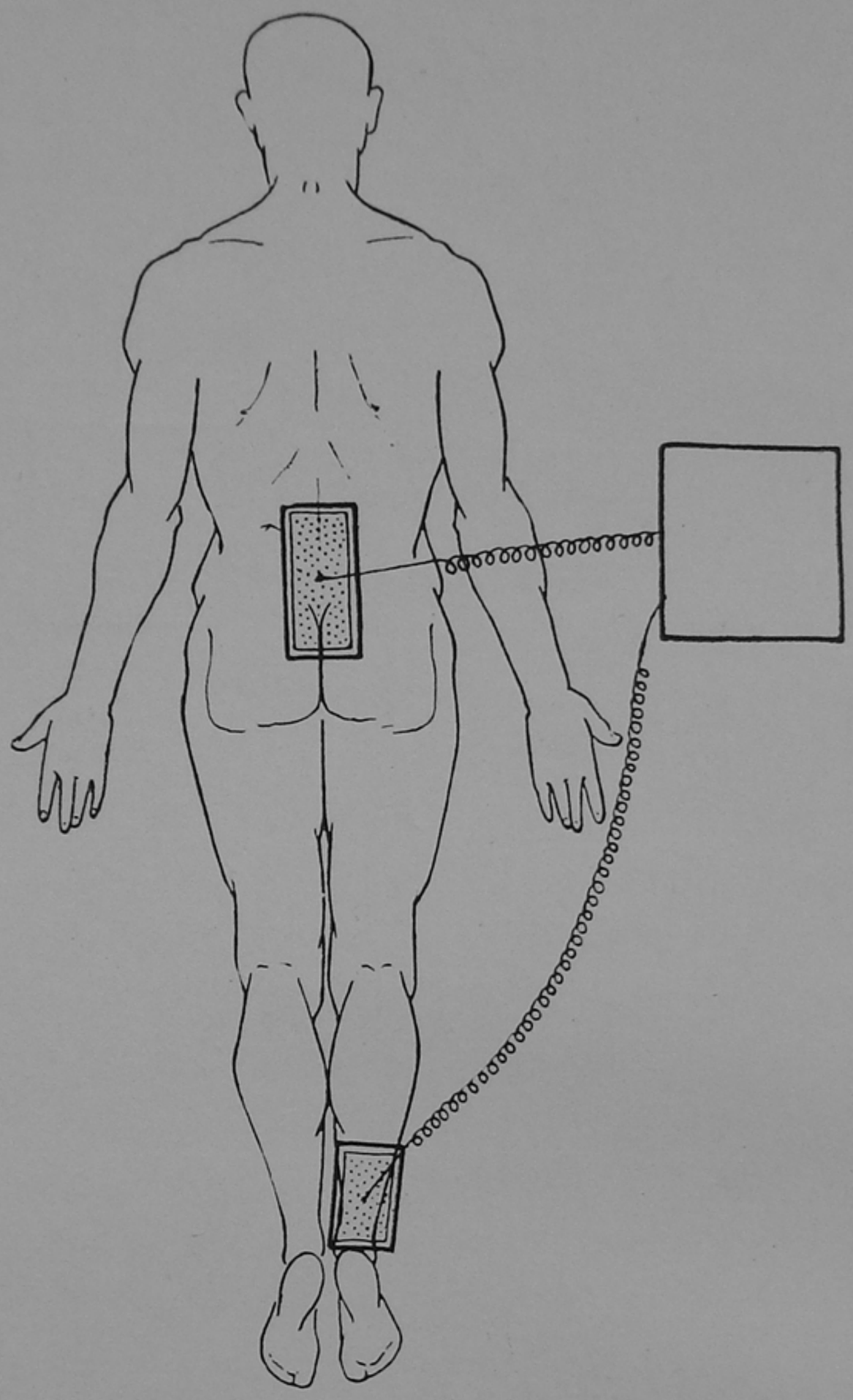


Figure 45

Paralysis, Infantile

Following the acute state, the application of the Surging Pulsating Direct Current will produce astonishing results in the average case.

Technic: Surging Pulsating Direct Current.

Surface electrode at the spine. Negative pole.

Surface electrode at the wrist or ankle. Positive pole.

Current strength, 5 or 6 M. A.

Time of treatment, 5 to 10 minutes.

Frequency of treatment, daily.

Various ways and means of applying the current to desired parts are used, as follows:

1. If lower limbs are affected, the foot may be immersed in warm baths in porcelain or glass containers.
2. One surface electrode, well saturated, may be placed on the back at the lumbar region.
   One smaller surface electrode or moist gauze may be wrapped around the feet and covered with wet chamois to distribute current.
   Cam No. 5 is used for treating lower limbs.
3. If upper limbs are affected, two arm baths may be substituted and used as the two foot baths are used.
4. If arm and hand are affected, a pad may be placed on the shoulder. Another gauze pad placed around the hand and forearm with the arm supported longitudinally.

Prostatic Enlargement

Technic: Surging Sine Wave Current.
Surface electrode 5 x 8 on abdomen.
Prostatic electrode inserted through the rectum against the prostate.
Apply diathermy to heat the part to comfortable toleration.
Follow by, same electrodes in place,
Cam No. 6 or No. 7.
Current strength, sufficient to definitely sense contraction in the rectum.
Time, 10 to 15 minutes.
Frequency of treatment, three times weekly.

Prostatic Infection, Non-purulent

Same technic as for Prostatic Enlargement.

Pruritis Ani

Technic: Non-Surging Galvanic Current.

Shape a piece of zinc or block tin about $2\frac{1}{2}$ inches in diameter, so that it fits between the nates.
Place over this zinc or tin electrode, a thick pad of gauze, well saturated with warm solution of zinc sulphate, 10 grs. to ounce. Positive pole.
Surface electrode 5 x 8 on the back. Negative pole.
Increase current gradually to from 4 to 5 M. A.
Time of treatment, 20 minutes.
Frequency of treatment, as indicated.

If there is a great deal of thickening of membrane which does not respond to zinc ionization, use Lugol's solution with the same technic *except* that when that is being used, the negative pole is attached to the active electrode between the nates and the positive pole to the 5 x 8 surface electrode on the back.

Raynaud's Disease

Technic: Non-Surging Galvanic Current.

Surface electrode 5 x 8 at nape of neck. Positive pole.
Foot in foot baths of water. Negative pole.
Current strength, 10 to 15 M. A.
Time of treatment, 20 minutes.
Frequency of treatment, daily.

This treatment may be preceded with diathermy to good advantage.

Rectum, Lack of Muscle Tone

Technic: Surging Sine Wave Current.
Metal rectal bipolar electrode in rectum, to which both wires are attached.
Cam No. 2 or No. 4.
Current strength, sufficient to contract muscles of the rectum.
Time of treatment, 5 to 10 minutes.
Frequency of treatment, daily for three days, then three times weekly.

Retinal Hemorrhage

Technic: Non-Surging Galvanic Current.
Surface electrode 4 x 5 on back of neck. Negative pole.
Gauze pad moistened in warm water over eyes. Positive pole.
Current strength, 2 M. A.
Time of treatment, 8 minutes.
Frequency of treatment, three times weekly.

Rhinitis, Hypertrophic

Technic: Non-Surging Galvanic Current.
Double a piece of copper wire on itself about three inches back from the terminal. Wrap wire with cotton, saturated with solution of adrenaline chloride. Insert this as far back in the nose as possible. Positive pole.
Surface electrode 5 x 8 on back at cervical region.
Current strength, 2 to 5 M. A.
Time of treatment, 5 minutes.
Frequency of treatment, three times weekly.

With this technic the astringent effect of adrenaline and the antiseptic and astringent effects of copper are secured. If both sides are affected, treat each side separately. A rapid improvement can be expected.

Rheumatism

A condition, the cause of which is more often than otherwise found in some source of infection, as the teeth, tonsils, or intestinal tract. The most common source of infection to which rheumatism may be traced is the colon. Invariably, such cases will be accompanied by symptoms leading to intestinal stasis, the correction of which will clear up the infection and auto-intoxication.

See treatment for Intestinal Stasis.

Treatment of the cause must be followed by local application which greatly relieves pain, soreness, stiffness and inflammation.

Technic — For local area:

Surging Pulsating Direct Current.
Surface electrode 4 x 5 to the back. Positive pole.
Surface electrode 4 x 5, covered with gauze, saturated in solution of 2 per cent sodium salicylate over painful area. Negative pole.
Cam No. 6.
Current strength, 10 to 15 M. A.
Time of treatment, 15 minutes.
Frequency of treatment, three times weekly.

Rodent Ulcer

Technic: Non-Surging Galvanic Current.

For small ulcers:
Thoroughly cleanse the ulcers with a solution of hydrogen peroxide and cover the area with a pad soaked in a solution of zinc sulphate. This is covered with a zinc plate to which is connected the positive pole. The plate must be held firmly in place.

Surface electrode 5 x 8 on the back. Negative pole.
Current strength, 2 to 4 M. A.
Time of treatment, 20 to 30 minutes.

A reactionary inflammation will result. This can be soothed by a dressing of magnesium sulphate, 5 per cent solution. Treatment can be repeated in three weeks if the ulcer has not entirely healed.

Salpingitis, Non-Purulent

Technic: Surface electrode 5 x 8 over abdomen. Negative pole.
Carbon ball electrode, cotton covered, high in vagina, directed to affected side. Positive pole.
Current strength, 10 to 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, twice weekly.

Scar Tissue

Technic: Non-Surging Galvanic Current.

Saturate a thick gauze pad in 1 per cent solution of sodium salicylate, sodium iodide, sodium chloride, or 1 per cent potassium iodide. Place gauze over saturated surface electrode 4 x 5. Apply this electrode over scar tissue. Negative pole.
Place 5 x 8 surface electrode on any convenient distant point, preferably opposite the scar. Positive pole.
Current strength, to toleration.
Time, 30 minutes.
Frequency of treatment, daily, or three times weekly.

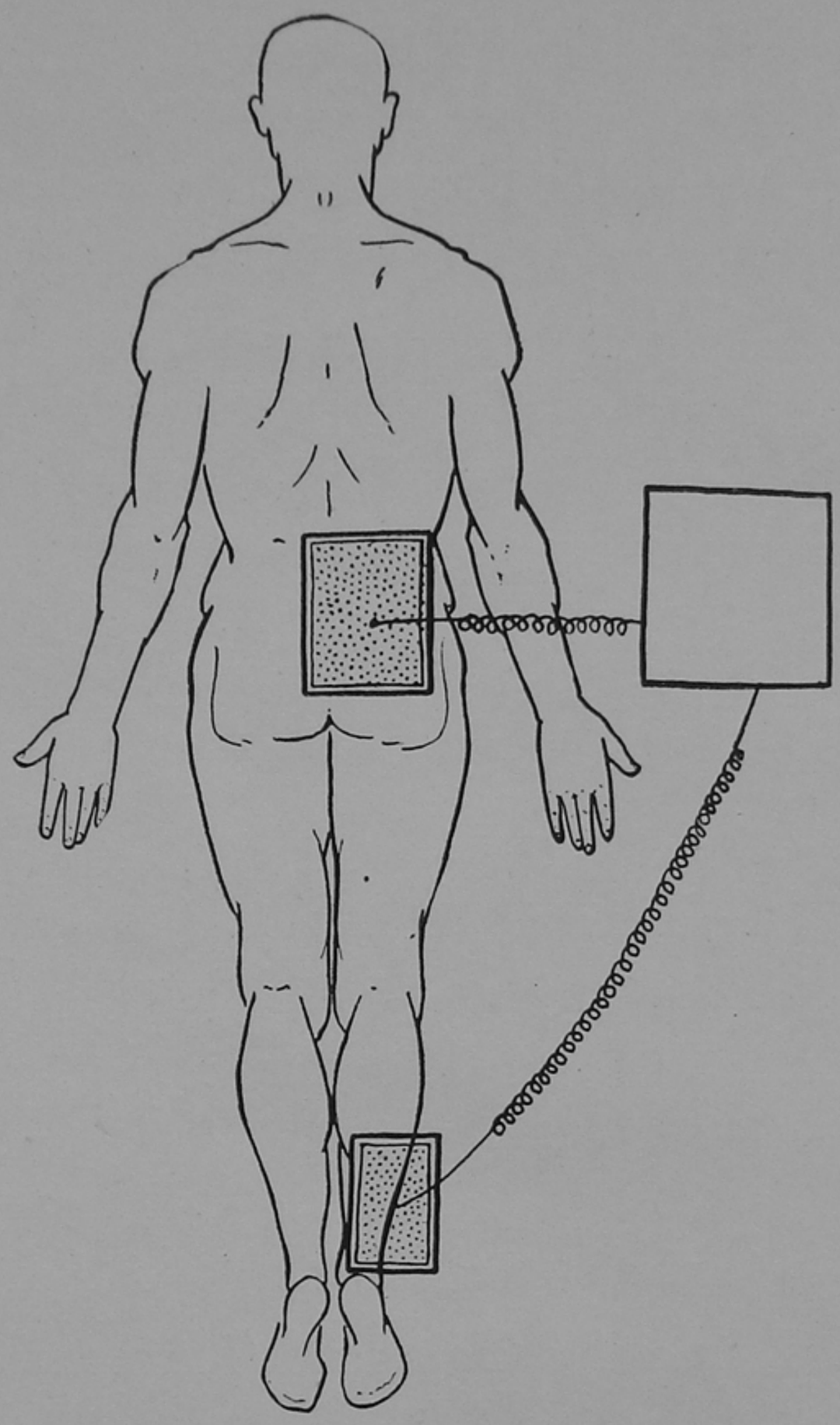


Figure 46

Sciatica

Sciatic neuritis is a condition which, if the history of the nerve injury is not present, may be more often than otherwise traced to intestinal stasis in the region of the cæcum or sigmoid. While the case should be treated as outlined for intestinal stasis to remove the cause, a local painful area should be treated as follows:

Subinvolution

(Same technic as for Salpingitis)

Technic: For local painful area.

1. Non-Surging Galvanic Current.
   Surface electrode 5 x 8 over the sacrum on affected side. Positive pole.
   Surface electrode 4 x 5 over lower, outer leg. Negative pole.
   Current strength, 10 to 15 M. A.
   Time of treatment, 15 minutes.
   Frequency of treatment, three times weekly.

See Figure 46 for correct position of electrodes.

Technic:

2. Non-Surging Galvanic Current.
   Surface electrode 3 x 3 over sciatic notch. Positive pole.
   Surface electrode 4 x 5 over lower outside of leg just below painful area. Negative pole.
   Current strength, 10 to 12 M. A.
   Time of treatment, 10 minutes.
   Frequency of treatment, daily.

Stenosis of the Cervix

See Cervix, Stenosis of, page 63.

Stomach, dilation and ptosis of.

Ulcers

See Rodent. See Varicose.

Uterine Fibroid

Low volt currents in gynæcology.

The electrical treatment of diseases of women has one element in it which prevents it from ever being looked upon with favor by the surgeon. While just as much diagnostic skill is required as in surgery, electrical treatment, unfortunately, requires an enormous amount of time, comparatively speaking.

The diseases and functional disturbances which are amenable to successful treatment by electricity are:

Amenorrhœa, Dysmenorrhœa, Menorrhagia, Cellulitis, Non-Purulent Salpingitis, Endometritis, Metritis, Subinvolution, Superinvolution, Uterine Fibroids, Deficient Development, Stenosis of the Cervix and Uterine Misplacement.

In giving technics for the use of electricity on any part of the body, it has to be assumed that the diagnosis is sufficiently clear, and that the operator is equally cautious not to invade pathological areas where the current would be useless or do positive harm. Nowhere should the above statement be so strictly followed as about the delicate structure of the uterine appendages.

The following suggestive technic outlines procedures which apply to the majority of cases. Dosage required is of great importance.

Fibroids of the sub-mural or sub-peritoneal variety, those large enough to cause obstruction of any consequence, or a rapidly growing one, in a patient under thirty-eight are strictly surgical.

With an average case of interstitial fibroid, whether hemorrhagic or otherwise, where the proper technic is pursued, the patient can be made symptomatically

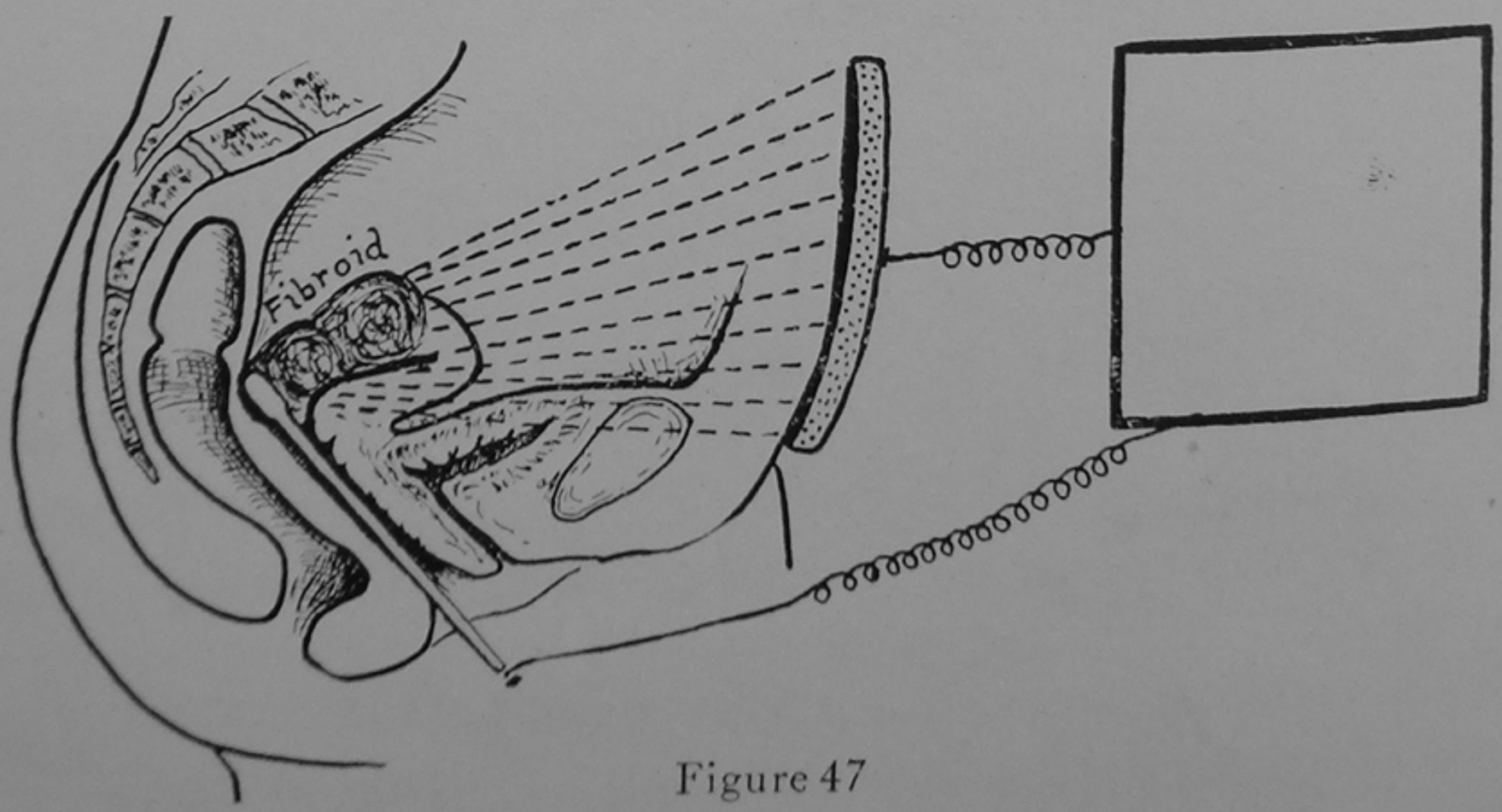


Figure 47

well, with the tumor diminished to a degree commensurate with the faithfulness with which she continues her treatment, until it is pronounced unnecessary.

The growth will disappear no more than will the uterus, as it is a part of it, but a diminution in size to the extent of relieving pressure will result, and a patient who constantly complains of discomfort will find herself in a condition of comparative ease. What more can a reasonable person expect when the possible dangers of surgery are confronted?

Figure 47 represents an interstitial uterine fibroid of medium size, situated posteriorly and easy of access.

Technic: Non-Surging Galvanic Current.

Cover carbon ball electrode with absorbent cotton, moistened with some antiseptic solution, or better still, antiseptic gauze moistened to complete saturation to insure good conduction. Do not use vaseline or other demulcents of an oily nature, such as would interfere with passage of the current. Non-irritating surgical soap is good.

Place the electrode firmly against the best-presented surface of the tumor.

In the case illustrated, the fibroid is in the posterior cul-de-sac.

Place the moist surface electrode 5 x 8, thoroughly saturated in warm water, in position as illustrated. Be sure that every inch of its surface bears firmly on the skin.

Connect positive pole to carbon ball electrode.

Connect negative pole to surface electrode.

The current strength is then gradually increased until a current of 20 to 30 M. A. is passing, depending on the sensation and toleration of the patient. Do not exceed 30 M. A.

It is best in susceptible, hypersensitive patients, to hold to about two thirds of the intended dosage for a period of two minutes, and as the skin becomes moistened, and resistance thereby lessened, increase to full dosage.

Time of treatment, average 15 minutes.

Frequency of treatment, as indicated.

If the fibroid is situated anteriorly or laterally, the point of contact should be adjusted so that the current, as indicated by the dotted lines, may penetrate upon it from the abdominal electrode. If the case is not hemorrhagic, the internal electrode may remain in place and a Non-Surging Sine Wave Current used through the back, as shown in Figure 49, for its local tonic sedative effect, rather than for any special action on the tumor itself. The abdominal electrode, during the use of the Sine Wave Current, would, of course, have been removed. If a Galvanic Current is permitted to pass through the tumor for a longer period than twenty minutes, it is quite possible that the patient may complain of a deep-seated pain, due to the contractile interpolar action.

A word of caution here is necessary: if the patient complains of a deep pain or feeling of soreness after the current is turned on, ascertain at once if there is a pus tube, or adhesions about the cæcum or elsewhere, from which harm might come, if the treatment is persisted in. If discomfort is caused by the vaginal electrode pressing a little too firmly, release it slightly and remove the difficulty.

Uterus, Prolapse of

For ordinary uncomplicated uterine prolapse, retroversion, anteversion and relaxation of vaginal walls, the following technic will be found to give most gratifying results:

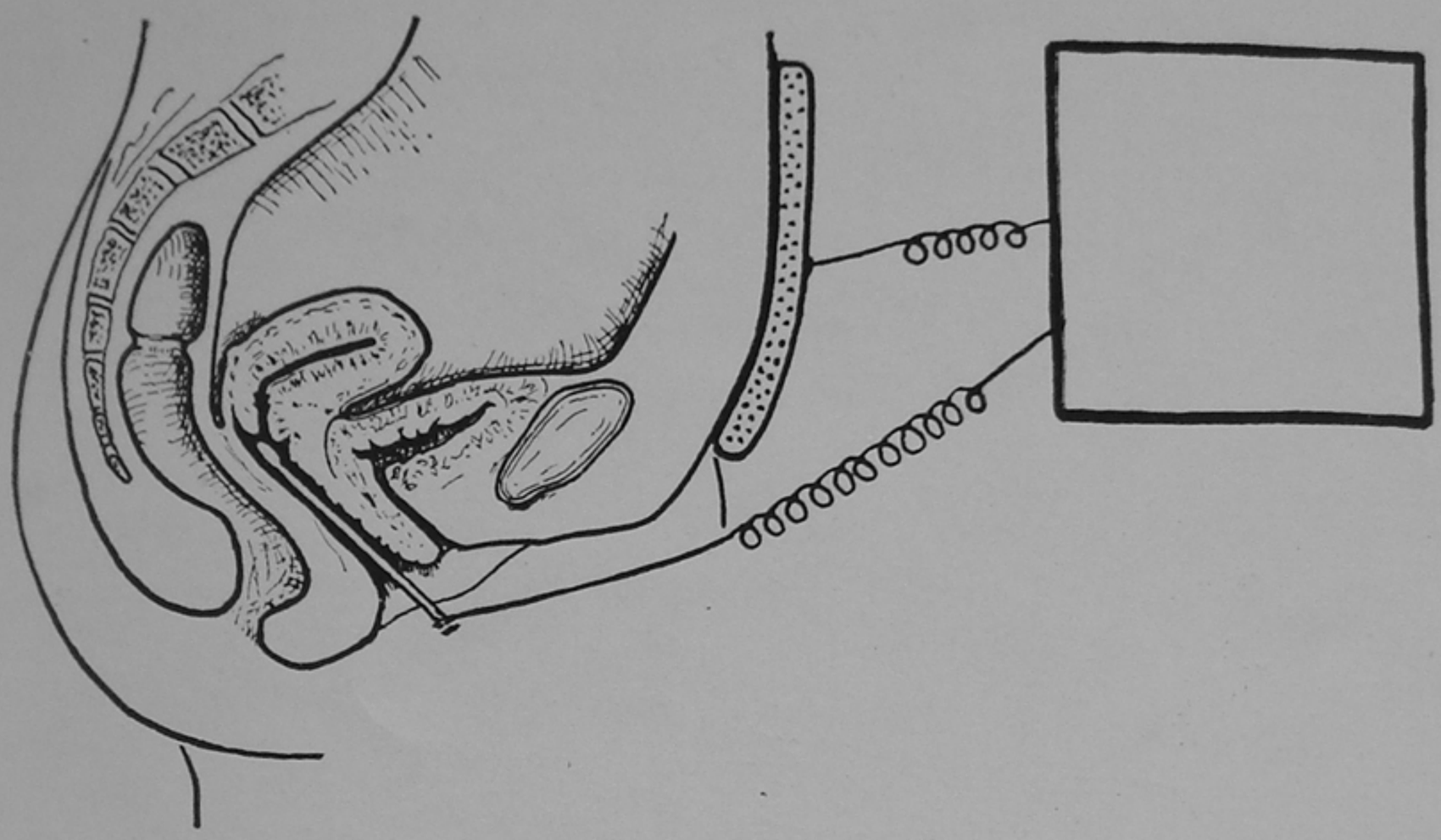


Figure 48

Technic:

Surface electrode 5 x 8 over abdomen, negative pole (as in Figure 48).
Carbon ball electrode, cotton covered, placed against the uterus. Positive pole.
Current strength, 15 M. A.
Time of treatment, 10 minutes.
Frequency of treatment, twice weekly.

This should be followed by an additional treatment with surface electrode 4 x 5 on the back as illustrated in Figure 49.

Technic:

Vaginal metallic electrode in place of carbon ball.
Use alternating current, to produce mild rhythmic contractions.
Cam No. 2.
Time of treatment, 10 minutes.
Frequency of treatment, twice weekly.

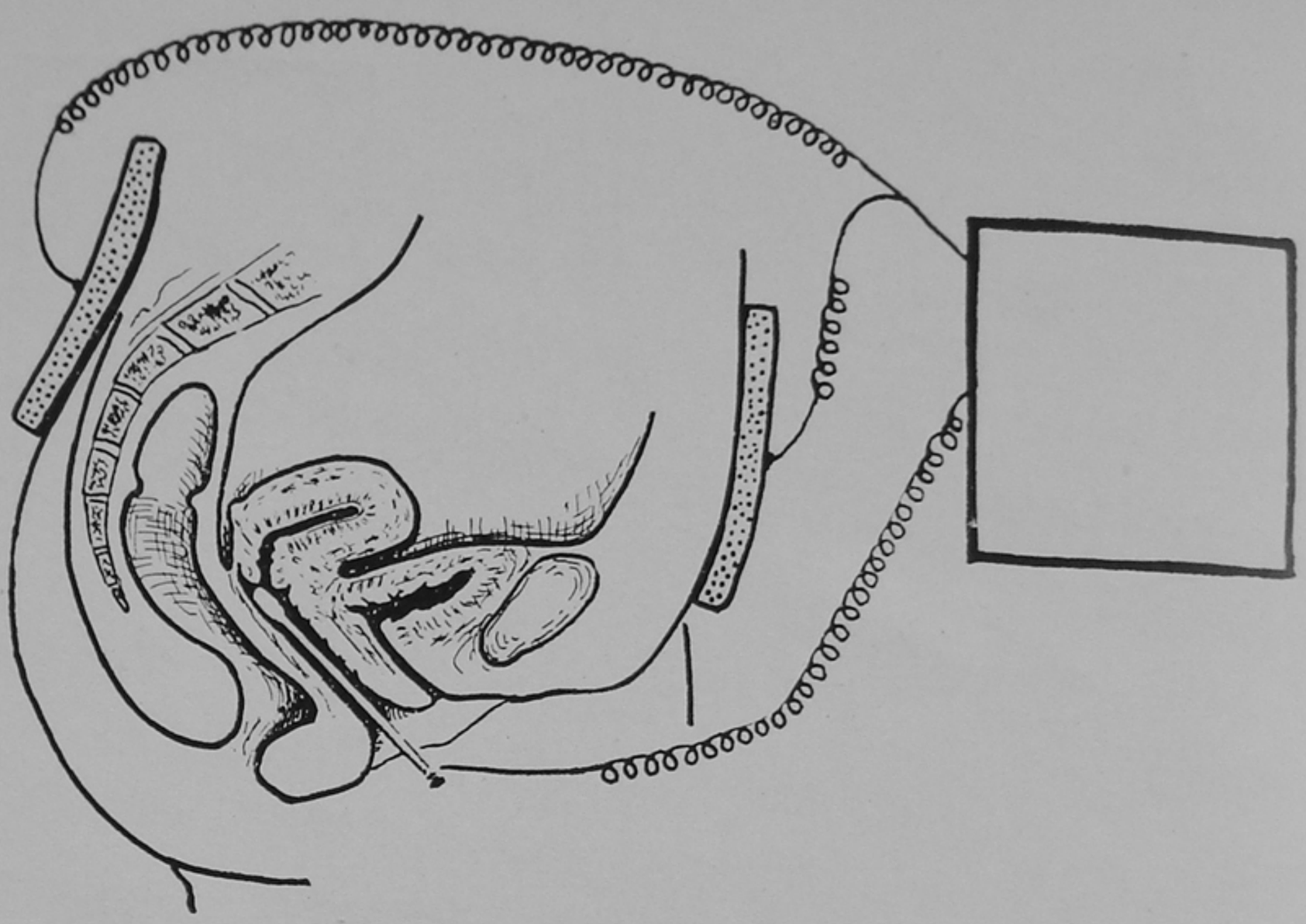


Figure 49

Uterus, Infantile

Married Women

Technic: Non-Surging Galvanic Current.

Surface electrode 5 x 8 placed on abdomen.
Positive pole.
Carbon ball electrode, covered with cotton, saturated with water, placed high in the vagina.
Negative pole.
Current strength, 8 to 12 M. A.
Time of treatment, 10 to 30 minutes.
Frequency of treatment, twice weekly.

Unmarried Women

Technic: Surface electrode 5 x 8 over sacrum.

Surface electrode 4 x 5 over lower abdomen.
Current strength, 8 to 15 M. A.
Time of treatment, 30 minutes.
Frequency of treatment, three times weekly.

Both technics should be followed by Surging Sine Wave Current, using surface electrodes as above.

Technic:
Use Cam No. 8.
Current strength, sufficient to sense contraction.
Time of treatment, 10 minutes.
Frequency as above.

Vaginal Walls, Relaxed

Technic: Surging Sine Wave Current.
Bipolar metal vaginal electrode in the vagina to which both wires are attached.
Cam No. 2 or No. 6.
Current strength, sufficient to contract vaginal muscles.
Time of treatment, 5 to 10 minutes.
Frequency of treatment, daily for three days, then three times each week.

Varicose Ulcers

Technic: Radiant light or heat from a non-vacuum electrode, followed by
Non-Surging Galvanic Current.
Surface electrode 5 x 8, placed on opposite side of the limb from ulcers. Negative pole.
Apply several layers of gauze saturated in zinc gelatine solution, and over this apply a piece of block tin shaped to the ulcer and bind in position. Positive pole.

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ELECTRO-THERAPY

WITH THE

MORSE WAVE GENERATOR

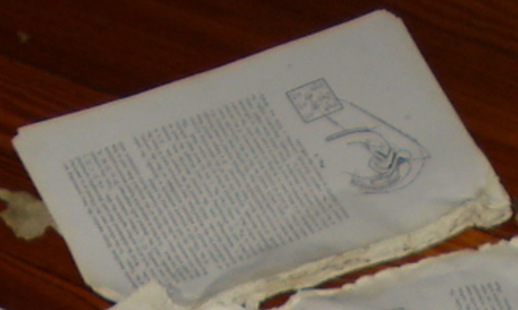
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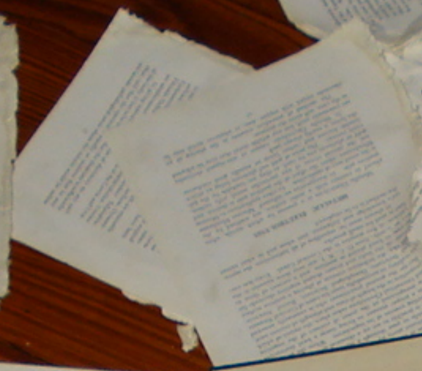
FREDERICK H. MORSE, M. D.

University of City of New York, 1907

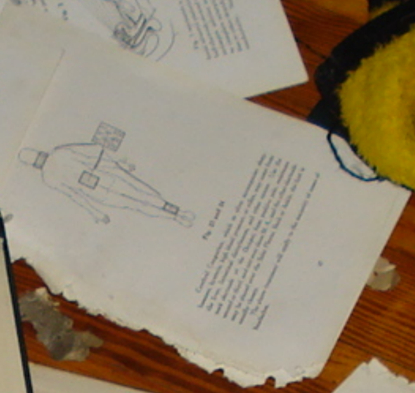
President of the American Electro-Therapeutic Association, 1904; President of the Section on Electro-Therapeutics, American Medical Association, 1905; Examining Physician, Electrical Department, Bellevue Hospital, 1905-1907; Instructor in Medical Electricity, New York Post-Graduate Medical School and Hospital, 1906-1907; Author of "Electro-Therapeutics," New York and London, 1907.













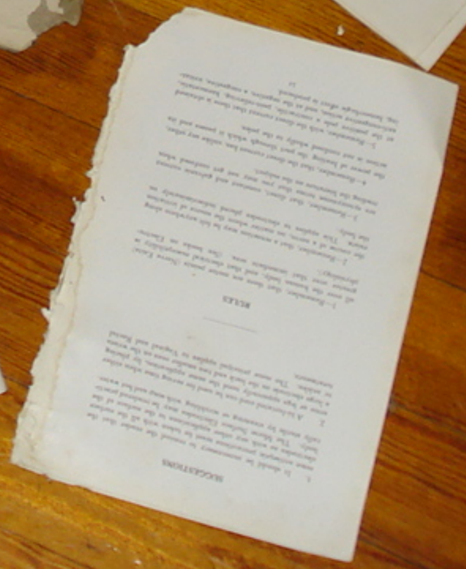












DEDICATIONS

1.—Dermatitis. Dedicated to my friend Dr. Thomas Dermatitis, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

2.—Eczema. Dedicated to my esteemed friend Dr. Thomas Eczema, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

3.—Psoriasis. Dedicated to my friend Dr. Thomas Psoriasis, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

4.—Furunculosis. Dedicated to my friend Dr. Thomas Furunculosis, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

5.—Pruritus. Dedicated to my friend Dr. Thomas Pruritus, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

6.—Acne. Dedicated to my friend Dr. Thomas Acne, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

7.—Alopecia. Dedicated to my friend Dr. Thomas Alopecia, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

8.—Hyperidrosis. Dedicated to my friend Dr. Thomas Hyperidrosis, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

9.—Seborrhœa. Dedicated to my friend Dr. Thomas Seborrhœa, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

10.—Ichthyosis. Dedicated to my friend Dr. Thomas Ichthyosis, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

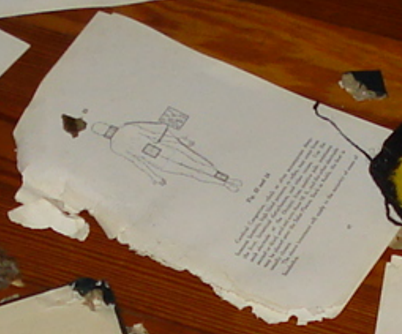
11.—Lupus Erythematosus. Dedicated to my friend Dr. Thomas Lupus Erythematosus, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

12.—Lupus Vulgaris. Dedicated to my friend Dr. Thomas Lupus Vulgaris, who has done much to relieve the suffering of his patients. This volume is therefore gratefully dedicated to him.

ELECTRO-THERAPY

MORSE WAVE GENERATOR











ELECTRO-THERAPY

WITH THE

MORSE WAVE GENERATOR

BY

FREDERICK H. MORSE, M. D.

University of City of New York, 1881)

President of the American Electro-Therapeutic Association in 1906, President of The New England Electro-Therapeutic Association 1906-1907, Instructor on Electro-Therapeutics at Tufts College Medical School, 1907-1908, U. S. Delegate to International Congress of Physio-Therapy at Rome 1907 and Paris 1910.

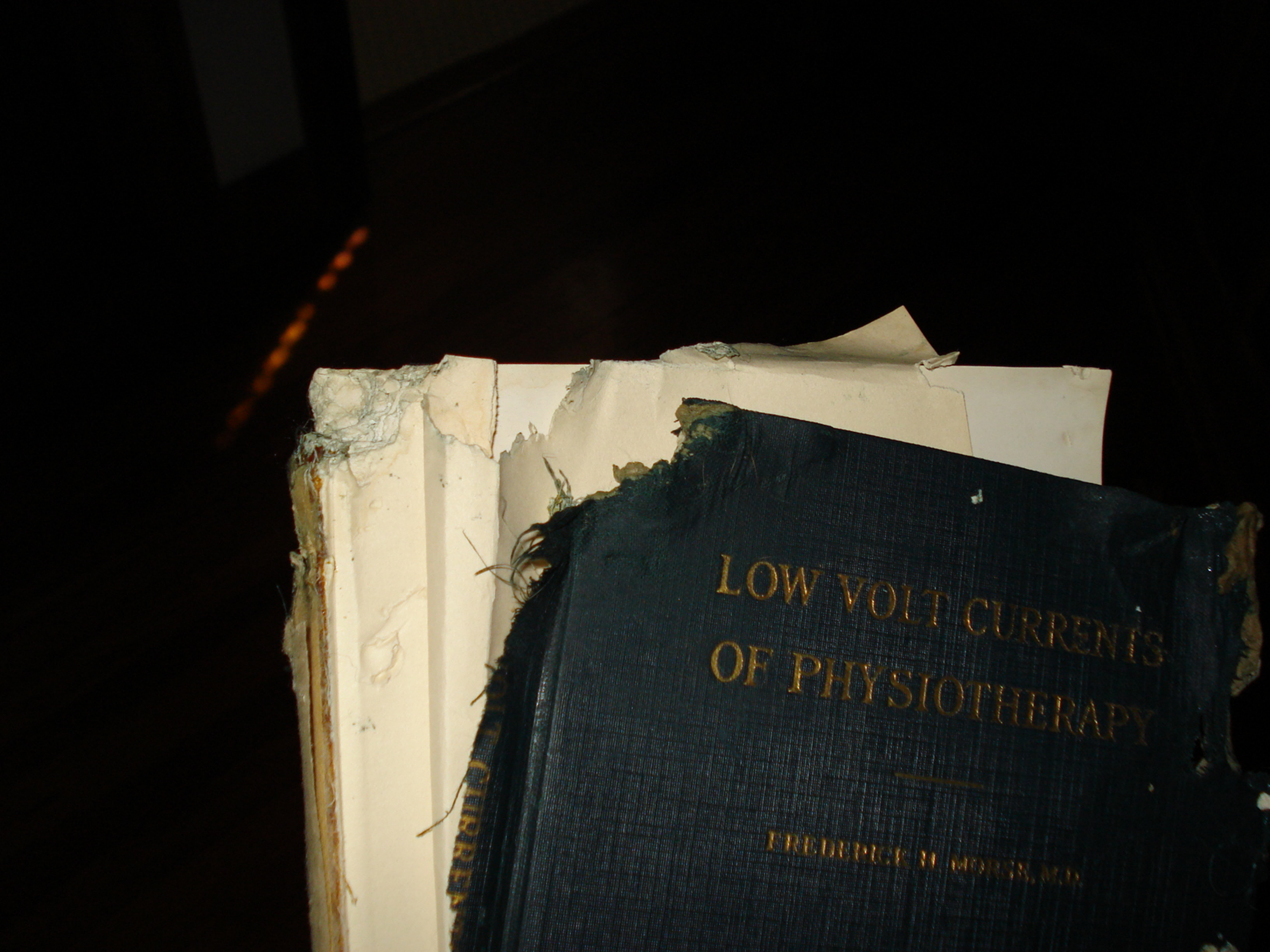
INTERSTITIAL ELECTROLYSIS

Interstitial Electrolysis is a process whereby tissues may be dissolved by means of a metal contact with the negative pole

Electrolysis is the decomposition of a chemical compound into its constituent parts by an electric current. If a substance is made to pass through a liquid and its particles to a separating process similar to living contact of the current is interrupted at the point of contact. The extent of which depends upon the length of time and strength of current used. But for the reconstructive powers of living tissue, the destructive action of the current would be unlimited. Osteophageal Structures, Rectal Structures, Cervical Stenosis, Stricture, the reconstructive contents of placing a positive electrode for the essential practitioner who is constantly treating cases of Cervical Stricture, Stricture of the Cervical Canal. Even less current is required in the treatment of Cervical Stricture, Stricture of the Cervical Canal. Even less current is required in the treatment of Cervical Stricture, Stricture of the Cervical Canal. Even less current

METALLIC ELECTROLYSIS

Metallic Electrolysis is a process by which metals, when placed in contact with a moist surface, are oxidized by the positive pole. In therapeutics, as adapted to Mucous Membrane, it is the object of the positive metal only carbon, which is only one insoluble by the galvanic current, which is only one insoluble by the galvanic current, which is only one insoluble by the galvanic current


LOW VOLT CURRENTS
OF PHYSIOTHERAPY
FREDERICK H MORSE, M.D.

LOW VOLT CURRENTS
OF PHYSIOTHERAPY

FREDERICK H. MORSE, M.D.

WF-IV40
1971

ELECTRO-THERAPY

WITH THE

MO[illegible]E WAVE GENERATOR

ELECTRO-THERAPEUTICS

WITH THE

MORSE WAVE GENERATOR

Low volt currents used for therapeutic purposes are now classified in three groups, and bear the same names as currents of the same general character in the scientific electrical field.

Group No. 1
The Non-Surging Sine Wave Current
The Surging Sine Wave Current

Group No. 2
The Non-Surging Pulsating Direct Current
The Surging Pulsating Direct Current
The Interrupted Pulsating Direct Current

Group No. 3
The Non-Surging Galvanic Current
The Surging Galvanic Current
The Interrupted Galvanic Current

Surge Defined

The surge of the low volt currents, as used for therapeutic purposes, may be defined as a slow, gradual rise and fall of current strength, produced by mechanical means, and causing periodical contractions of muscle tissue with intervening periods of rest.

Selective Motion Cams of the "Morse" Wave Generator

The seven distinct surges described on the following pages are caused by the use of cams designed to produce a smooth, gradual increase and decrease of current at definite periods, with definite intervals of rest between. The period and character of the surges and consequent muscle contractions are governed by the shape of the cam designated for the work in hand.

No matter whether the Sine Wave, the Pulsating Direct or the constant Galvanic Current is being used, the actual character and frequency of the surges are the same. To illustrate both the character and frequency diagrammatically, which can be clearly visualized, the constant Galvanic Current has been charted.

The great advantage derived from the use of cams for producing the required surges is that by introducing a variety of shapes we can control not only the speed and length of the surge but its character as well. For example: the use of Cam No. 3 causes a gradual increase of voltage to maximum with a corresponding decrease to minimum and equal periods of rest. Cam No. 4 gives exactly the same number of surges per minute as Cam No. 3, but it will be noticed that by altering the shape of this cam, we have caused a more abrupt increase and decrease of the current than produced by Cam No. 3, we have increased the length of time during which it remains at maximum voltage.

Figure 5 is a chart on which a curve has been scribed indicating the increase of current strength from minimum to maximum and at relative positions of the sine wave indicator. (Non-surging currents.)

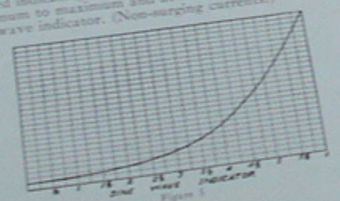


Figure 5

ALTERNATING CURRENT

Alternating currents of electricity as distributed from the street lighting circuits while available for lighting and power, cannot be used for therapeutical purposes. The process of reducing by means of transformers, make it practical for the physician's use.

It is a principle of well-known physical laws that penetration, through liquid or solid bodies, by heat, light, sound and

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42	Mar acct	1/4 Reserve	3.70
43	July acct	Reserve	3.72
	" "	Charge Back	30.69

April 20-1944 Chg Back of 30.69 still stands.

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Clyde Attenburg D.S.C. 1003-4 U.B. Bldg. Dayton O. 18 mos.

			Commission Dr	Commission Cr	Rate Dr	Rec Cr.
4' 8/23	"B" Short Wave # 106066					
	Tubes #2001-2052	249 20	99 86		22 46	
	and access.					
8/28	Commn. less rec.			77 34		
Jan '24	acct 1/4 reserve					5 61
April	final " "					16 85
	April account charge back		74 08			
May	acct Re Instate	74 08	59 26		14 82	
July	" 1/4 reserve					3 70
Sept	" 1/4 " "					3 70

(over)

J. K. Bailey M.D. 22 Brown Ave. Dayton O., 1 yr.

			Total Comm	Comm Pd	Reg Dep	Rec Cr.
11/22	"M" Short Wave # 105612					
	Tubes #26615-26627	415 50	99 72		20 24	
	100% - Freight		1 48			
12/10				80 96		
24	Feby acct					5 06
	May "					5 06
	Aug "					5 06
	Nov "	Final				5 06

Ref. Equipment Co.
HE 8331

Imperial- CTI-150-
20A9797
Tag 1843

| | | |

Block. M. E. MD. 108 Troy St Dayton, O. 6m.

			Total Comm	Comm Pd.	Note Dr.	Rec. Cr.	
6/20	"M" #105602						
	Tubes #27659-27590						Spec. Allow.
	Cable + Blocks.	364 50	91 13		18 53		25 00
	Freight		1 54				
6/28				49 14			
	Aug. acct	1/4 reserve.				4 63	
	Sept "	1/4 " "				4 63	
	Nov "	1/4 " "				4 63	
	Dec "	1/4 " "				4 64	
	Final						

Wm Braunicker D.O.S. Brookville Ohio 1 yr.

			Total Comm	Comm Pd	Note Dr.	Rec. Cr.	
40 5/22	W. M. Df. # B 2597						
	Tube # 2594						25% - 500
	Trans. # B-9191						15% - 100
	Tuner # 57529	60 00	140 00		21 00		
5/26	Comm less reserve						
	Spec allow. #25 00			91 00			
	Aug acct	1/4 reserve				5 25	
	Nov. "	"				5 25	
41	Mch 22 Apr "					5 25	
	June 19 May "	Final				5 25	

~~300~~ 3.

F. W. Circle D.S.C. 805 Iroquois Bldg Springfield, Ohio. Cash.

			Total Comm	Comm Pd.
9/12/8	Model J Rec.			
	#44754			
	SW1-12 #104686			
	Tubes #2V26; 2V76			
	and Access.	513 08	128 27	
9/27/8				128 27

15%

40	M.R. Clark. M. D.	1307 Germantown St. Dayton, O.									2 yrs.
2/5	"M" S.W. # 105692		Total Comm.		Comm Pd		Reg. DR		Reg. CR.		
	Tubes # 26793; 25058	396	20	95	09			19	37		Freight 2.75
2/12						78	27				
41	Aug acct	1/4 reserve								489	
Mch 2	Feby "	1/4 "								489	
47	Aug "	1/4 "								489	
	Feby "	1/4 "								490	
		Final									

	Lou N. Cooper. 1125-27 Reibold Bldg. Dayton O.										18 mo.
# 1-2	"B" Short Wave #			Commission Dr.		Cr.		State Tax Dr.		Res. Cr.	
	Tubes #	236	70	96	68			19	34		
1/8	Comm. less rec.					77	34				
	Aug. acct	1/4 reserve								483	
	Apr "	1/4 " "								483	
	Jan "	1/4 " "								483	
	July "	1/4 " "								485	
		Final									

1930	DENNIS. G.H. M.D. 1437 W. 3rd St.					Dayton, Ohio.					24 mos.
4/4	SWD1-24 # 105163			Total Comm		Comm Rec.		Rec DR		Res CR	Less - 1% -
	# 3A 59; 3A 32. Accum	365	15	87	64			17	52		
4/17	ck # 41444 X Comm.					70	11				
40	Oct acct 1/4 reserve									438	
	April acct "									438	
41	Oct " "									438	
	April " "			Final						439	

#10 Victor Pl. 24 mo.

Dobeleit. R.F. D.O. ~~2119 N. Main St~~ Dayton, Ohio

39				Total Comm		Comm Pd		Reg Res Dr		Res Cr.		
1/17	Model R # 104928 25316											
	Tubes - 25435 Taken	274	25	65	82			13	16			Postage.
1/27	1/2 Reg Comm.					26	22					.23 Spec allow.
4/4	1/2 " "					26	21					
	July acct	1/4 reserve								3	29	
	Jan "	1/4 " "								3	29	
41	July "	1/4 " "								3	29	
Feby 19.	Jan "	1/4 " "				final.				3	29	

W. M. Deckwall. 74 Webster St. Dayton O. 2 yrs.

41				Commission Dr		Commission Cr.		Note Dr		Res. Cr.		
10/3	"5C" Short Wave # 105329											
	Tubes 4042; 4H45	391	00	142	65			31	15			
10/18	Commission less res.					111	50					25 - 331.14
	overdraft - W. Steele					14	11					100 - 58.36
	Ck # 10366					97	39					Int - 1.50
42	April acct	1/4 reserve								7	78	
	Oct "	1/4 " "								7	78	
43	Apr "	1/4 " "								7	78	
	Oct "	Final								7	81	

3 mo.

French. J.T. D.M. 1309 N. Main St Dayton, Ohio.

39				Total Comm		Comm Pd		Reg Res Dr		Res Cr.		
2/2	Swbd-24	371	70	92	93			13	93			
2/18						72	95					6.05 Spec allow.
4/17	March acct	1/3 res.								4	64	
5/16	April "	1/3 "								4	64	
6/12	May "	1/3 "								4	64	

38				Comm	Comm Rd
10/24. Access. (D76920)	8	50	2	13	
Nor acct					2 13

J. P. Gibbel M.D. Hallansberg, Ohio. 3 yrs.

			Total Comm.	Comm Pd.	Regular Dr.	Res. Cr.	
9/18	"GA-15-X-Ray #A13274						
	Hot cathode Tube #1389						24% - 442.50
	Remote Control #A12170						19 - 136.75
	Timer 55907 - Gen Elec.	982 34	177 41		35 48		14 - 238.91
9/28	ck #7793			70 43			11 - 22.65
'39	" 7932			70 42			9 - 20.43
'40							2 1/3 - 10.00
3/13	June acct 1/4 reserve					887	6 - 1.10
41	Mch " 1/4 "		Final			887	6.5 - 110.00
42	Dec " 1/4 "					887	Special allow
	July " 1/4 "					887	1.08

'40 Chas. Greenwell 632 Doctors Bldg Cincinnati O 1 yr.

			Total Comm	Comm Pd	Reg Dr	Res Cr	
5/29	"M" S.W. #106024						
	Tubes #26951-27031						
	Cable & Bracket.	364 50	91 13				
	Freight		1 68		12 92		
6/5	Comm. June reserve			78 89			
	Aug. acct 1/4 reserve					3 48	
41	Nov " "					3 48	
Mch 42	Feby "					3 48	
	4/11/41 charge back					3 48	31.31
June 19	Re instalements	April acct	Final				6 x 6 = 6 x 6 = 18.79

F. V. Grice M.D. 2703 W. 3rd St. Dayton, Ohio 18 mo.

			Total Comm	Comm Pd.	Reg Dr.	Res Cr.	
10/11	"S" - #10.5501						
	Tubes #26968-26979	329 50	79 08		15 82		
10/21	ck #8351			63 26			
40	March acct					395	
	July "					395	
41	Dec "					395	
	June 19 - May "		Final			397	

M. R. Haley M.D. 28 W. Monument Ave Dayton O. 6 mo.

				Total Comm	Comm Pd.	Spec Dr.	Res. Cr.
10/4	"C" 6 meter S.W.						
	# 103561						
	Tubes #'s 0080-40133	235	00	58 75		881	
10/27	ck # 8123				49 94		
	Dec acct	1/4	reserve				220
1940	Jan. "	1/4	" "				220
	Mch "	1/4	" "				220
	Apr. "	1/4	" "				221

Nettekens V.E. M.D. 228 N. Dowd St. Wilmington O. 4 mos.

			Total Comm	Comm Pd	Note Dr	Res Cr.
12/23	"B" - # 106470					
	Tubes - # 813, 807	289 50				
	Freight	1 50	111 38		21 71	
12/31 1941				89 67		
Feby 19	1/4 reserve					54 x
Mch "	"					54 x
Apr.	1/4 reserve					54 x
July "	"	Final.				54 5

Cash

J. M. Haines D.C. 116 W. Market St. Washington Ct. Ohio

			Commission Dr	Commission Cr	Note Receivable Dr	Note Receivable Cr
2/22	"M" S.W. # 105757					
	Tubes # 27462; 27453					
	Ind. cable & blocks	364 50	91 13			
2/29				91 13		
1946 4/26	J.C.W.	711 50				Cash.
4/29	25%	641 50	160 38			
	Comm. less allow.			80 38		

402 S. Ohio Ave

Dugland J. N. D.M. ~~230 S. Main~~ Ave, Sidney O. 3 yrs.

			Total Comm	Comm Pd.	Note Dr.	Note Cr.	
10 10/5	TP - 30-96 # B-18103						25 - 1780.50
	Dube # 1953; Trans. # 13069						100 - 100.00
	Deiner 9926; Cont. # B-10566						20 - 51.20
	and Accers.	1661 91	461 21		97 24		15 - 179.50
	Hunt order - 25897	109 85					12 - 20.50
10/9				363 97			10 - 1.86
41	Hunt - check			22 00			7 - 8.85
42	Aug acct	1/4 reserve				24 31	3 1/3 - 19.50
	May "	1/4 " "				24 31	
	Mr "	Final				486 x	

Ed. J. Keating M.D. 320 Main St, Hamilton, O., Cash.

			Total Comm	Comm Pd.		
40 2/24	"5", J.W. # 105783				25% -	350.35
	Tuten # 27583, 27552					
	and Accers.	3786 5	115 89		100% -	28.30
2/28				115 89		

John L Koehl Spring St, St. Marys Ohio

48 8/20	J.C.W and				
	Accers.	666 50			Contract
8/29	25%	605 50	151 38		Detroit
	100%	61 00	61 00		Repaired
	ck.			212 38	

Leo F. Lauterback 1425 Arbor Ave Dayton O.

'46														
11/18	Table	965	95											Cash
	Express & Frt.	11	77											
	25%	928	95	232	24									
	20%	37	00	7	40									
	Frt	11	77	11	77									
4/18								251	41					

1425 Arbor Ave Payment.
Lauterback Leo. F. MD. 2920 Wayne Ave Dayton O.

				Total Comm		Comp Pd		Note Dr.		Rec Cr.		
40												
12/3	T- B.37125											
	Quartz Spectrum	223	68	80	66			15	27			1.36 frt
12/9						65	39					
41	Mdse Final									15	27	
	765.00 335.50 5.15											
46												
3/29	F.C.W. - SP - Frt	1105	65									Cash
	25%	982	83	245	71							allow
	100% Frt	5	15	5	15							50.00
	100% overage	67	67	67	67							
41	Comm. Sec. overdraft					308	00					

1425 Arbor Ave
Leo F. Lauterback M.D. 2920 Wayne Ave Dayton O. 3 yrs.

				Total Comm		Comm Pd		Rep Dr		Rec Cr		
39												
10/16	"G.A-15" X-Ray #A13300											24% - 457.50
	Hot Cathode Tube #1411											19 - 120.25
	Tuner #55966											14 - 233.36
	Remote control #A12202	998	54	178	36			356	5			11 - 25.90
10/30	ck # 8580					71	31					9 - 25.43
17/12	" 9580					71	30					
40												
41	July acct			1/4	reserve					891	65	- 110.00
42	Apr "			1/4	"					891	6	- 1.10
	Jan "			1/4	"					891	2½	- 25.00
	Nov "			Final						891		

MEALY. A.T. M.D.

44
10/28 S.C. Short Wave
107575-12 Meter
Osc. Tubes #89014-89112
115-60 cy. Walnut.

B.G. Must M.D. 3374 E. 3rd St. Dayton Ohio 2yrs.

				Total Comm		Comm Pd		Note Reserve Dr.		Cr.	
9/30/38	SW1-12 # 104657										
	Tubes # 2P38; 2P47										
	Acceptance.	246	50	59	16			12	43		
10/1	1/2 reg comm.					22	26				141 spec below
	Correction					1	90				
Feb 1	1/2 reg comm.					24	16				
May	acct	1/4 reserve								3	10
Nov	"	1/4	"	"						3	10
May	"	1/4	"	"						3	10
Oct	"	1/4	"	"						3	13 Final

46
6/7 Geo. D. Martin M.D. 531 Central Ave Miamisburg O.

6/7	F.C.W.	808	90						
	25%	738	90	184	73				
	100% average	7000		7000					
6/17						254	73		

May. A.B. O.D. 1127 N. Detroit St., Xenia O. 3 yrs.

				Total Comm	Comm Pd.	Notes DR	Reserve CR
40 10/19	"J" - 30-96 - #13 18093						
	Tube #2458; Trans #13286						
	Diner #9838; Cont #B10551						
	and access.						
	"J" Generator #B 35027	2139	86	676	95	146	81
	Heart order - 25942	77	74				
10/22 41					530	14	
42	July acct	1/4	reserve				36 70
43	April acct	1/4	"				36 70
44	Jan "	1/4	"				36 70
	Jan "		Final				36 71

25 - 1630.50
20 - 51.70
15 - 179.00
100 - 200.00
12 - 20.00
10 - 1.86
7 - 8.85
3 1/3 - 19.50
98. 2895

Miller Wm N. M.D. New Carlisle O.

				Total Comm	Comm Pd.	Notes DR	Reserve CR
12/12	"R" SW - #104441						
1939	Tubes #25005; 25017	265	00	63	60	12	72
?	1/2 comm				25	24	
Mch 9.	1/2 "				25	44	
July 28 - 40	June acct	1/4	reserve				3 18
	Dec "	1/4	"				3 18
July 3	June "	1/4	"				3 18
	Dec "	1/4	"				3 18
			Final				

O.S.C.

J. R. Moore 416 National Bk Bldg Lima O.

46 7/5	FCW.							Cash
		645	95					
7/10	25%	582	40	145	60			
	100% 2nd	255		255				
	100% overage	61	00	61	00			
	check					209	15	
7/25	J	511	50					allow
	25%	485	00	121	25			39 6⅔
	100% 2nd	1	15	1	15			
	100% overage	25	35	25	35			
	ck - less 8.77 overdraft					138	98	

3 yrs.

Mowry. J.R. O.C. 301 S. Main St. Bellefontaine O.

		Total Comm	Comm Pd.	Reg. Res. Dr.	Cr.	
6/13	"JJ" 30-96 - #B-18067					25 - 68.75
	Tube - #2227 - Tenner #9690					25 - 1180.50
	Trans. #B-13170.					20 - 51.20
	Control #13 10540					15 - 185.41
	and decen.	1747.07	475 53	100 71		12 - 31.00
6/28			374 82			10 - 1.86
41	Mch acct				25 17	7 - 8.85
	Dec "				25 17	3½ - 19.50
42	Sept "				25 17	95 - 99.98
43	July "	Final			25 20	

Peter H. Mulder

	Dr	45.00	Cr	Bal
May 1st			10.00	35.00
June 8			10.00	25.00
July 8			10.00	15.00

W. M. McLin 859 N. Broadway Dayton O. 3 yrs.

		Comm. Dr	Comm. Cr	Note Res. Dr	Note Res. Cr	
6/30	"JC" 30-96 #					25 - 1090.80
	Tube # Cont. C 11018					100 - 100.00
	Trans. #					20 - 205.25
	Tenner # 10194					15 - 179.00
	and decen.	1664.31	484 93	103 42		12 - 19.75
7/15	Comm. less res.		537 03			10 - 2.20
	overdraft		39.48 9 48			7 - 6.60
42	April acct 4% reserve				25 85	100 ft. 12.00
43	Jan acct charge Back 243.79					98 - 29.21
	Jan acct Reserve				77 57	

Charge Back 243.79

McLaggit

Re Instatement 243.79

859 N. Broadway

W. M. McLin M.D. 800 ~~Superior Ave.~~ Dayton O. 1 yr.

			Commission Dr	Commission Cr	Note Rec. Dr	Note Rec. Cr	
4/ 5/13	"CK" Lamp #C-37080						
		23000	37 50				
5/16	Comm less reserve			48 87	8 63		
	Spec. Allow.			10 00			
	Comm. paid			38 87			
	Aug acct	1/4	reserve			2 15	
	Nov acct	1/4	"			2 15	
	Feby "	1/4	"			2 15	
	July "	1/4	"			2 18	
			Final				

R. C. McNelly M.D. 1730 E. 3rd St. Dayton, Ohio 18 mos.

			Commission Dr	Commission Cr	Note Rec. Dr	Note Rec. Cr	
4/13	"M" S.W. # 105912						
	Tubes #27605; 27322						
	Cable & Blocks.	377 00	92 37				24.5%
	Freight		1 48		18 77		100%
4/19	Comm. less reserve						
	Special Allow.			50 08			25 00
4/	Sept acct	1/4	reserve			469	
Feb 19	Jan "	1/4	"			469	
July 19	June acct	1/4	"			469	
Dec	acct	1/4	"	Final		469	

M. J. Owens M.D. 4633 N. Dixie Drive Dayton Ohio 2 yrs.

			Commission Dr	Commission Cr	Note Rec. Dr	Note Rec. Cr	
4/15	"M" S.W. # 105911						
	Tubes #27925; 27924.						
	Ind. cable & blocks	377 00	90 48				24%
	Freight		2 67		18 63		100%
4/19	Comm less reserve			74 52			
	Oct. acct					4 65	
	Dec. "					13 98	

Final

Peles. F. M. D.C. 107 S. Main St. Miamisburg, O. 2yrs.

					Total Comm	Comm Pd.	Rec DR	Rec CR.	
39 6/1	SWD1-24 # 105077								
	3C85; 3C62								
	Unit # 0-1850	321	50	79	56		15	91	Less 1%
6/10	ck # 5340 Comm.					62	15		1.50 allow.
40	Dec. acct	1/4	reserve					3	97
7/13	June acct	1/4	"	"				3	97
41	Dec. acct	1/4	"	"				3	97
July 22	June acct	1/4	"	"		Final		4	00

60 days.

Pumphrey. J. L. D.O. Washington C.H. Ohio

					Total Comm	Comm Pd	Rec DR	Rec. Cr.	
39									
1/26	PRC-12 # 104888	328	75	82	19		12	33	
	Tubes - 25400 25430								
	Accessr.								
2/23						66	32		3.54 Spec. allow.
5/16	April acct							12	33

2½ yrs

Powell Borden D.O. 522½ N. Broadway Dayton, O. 30 ms

					Total Comm	Comm Pd.	Rec DR	Rec Cr.	
39									
7/4	W.M. Dealer # A-2571								
	Tube # 25211 - Timer # 55497	603	75	134	90		26	98	
7/28	ck # 6535 1/2 comm.					53	96		Less 1%
40	Sept 23 ck # 7695					51	21		2.75 O.J.
	March acct	1/4	reserve					6	74
	Oct "	1/4	"	"				6	74
41									
July 22	June "	1/4	"	"				6	74
42 Feby	Dec "	1/4	"	"				6	76
						Final			

'40 J. R. Perkins D.D.S. 4633 N. Dixie Dr. Dayton

7/26	C.W.D.X.					Contract Detroit
	A 18403	874	10			
	A 18364	26	25			
	A 18406	61	40			
	Parcel Post - Due. - 3¢		74			
	75%	702	50	175	63	
	15%	103	75	15	56	
	20%	4	90		98	
	12½%	49	30	5	92	
	5%	1	30		07	
	100% average check —	99	26	99	26	297 42

'40 Pfarrer. R.A. M.D. 2834 E. 3rd St Dayton O. 1 yr.

				Total Comm	Comm Pd.	Rate Dr.	Res. Cr.
6/15	"K" # 45136 and Quarty Specimens	205	30	51	33	7	70
6/28					43	63	
	Sept acct	1/4 reserve					19 2
41	Dec "	1/4 reserve					19 2
	Mch "	1/4 " "					19 2
July 2	Jones "	1/4 " "			Final.		19 2

Over

PFARRER R.A. M.D. 2834 E. 3rd St. Dayton Ohio 30 ma.

				Total Comm	Comm Pd	Rate Dr.	Res. Cr.	
'39	"G" Fluoroscope #44465					24%		2.65.00
	Tube #450 Trans. #44394					19%		400.00
	Control #A10010					14%		147.35
	Synchrotmer #7375					9%		33.00
	Invoice #3931 - 3992 $1069	845	35					845.35
2/25	Tube #924 Trans. #A13057			163	20		32 64	
	Mch 6 - ½ Comm.				65	28		
	May 9 ½ "				64	78		
	Nov acct - 1/4 reserve.						8.09	
40	Aug - acct 1/4 "						8.09	

OVER

42

Mch	acct	1/4 reserve	3.47
May	"	1/4 " "	2.25
June	"	1/4 "	3.47
July	"	1/4 "	2.25
Aug	"	1/4 "	2.25
"	"	1/4 final	2.25
Sept	"	1/4 reserve	3.47
43 Jan	"	1/4 final	3.47

41 May acct — 1/4 reserve 8.09
42 Feby acct — 1/4 " 8.09

Final

R. D. Potts M.D. 233 Valley St. Dayton Ohio Cash.

				Total Comm	Comm Pd.
40 2/8	"M" S.W. #105741				
	Tubes (#27430; 27344)				
	" #27650; 27663	364	50	91	13
2/12	Commission				91 13

W. E. Risinger M. D. 715 Cincinnati St. Dayton Ohio Cash.

				Total Comm	Comm Pd.
40 2/7	"5" S.W. #105552				
	Tubes #26118; 26232	361	50	90	38
2/12	Commission				90 38

W. A. Ricketts 1030 Fidelity Bldg. Dayton O. Cash.

46 6/24	F. C. W.				
	freight	785	62		
	25%	712	00	178	00
	100% overage	20	00	20	00
	100% Frt.	362		362	
6/27	Comm. less overdraft			193	99

50.00 allow.

John N. Simpson
3624 Fillmnt.
Bid submitted
+ accepted
4640 for
Lab on farm
on Snyder Rd

C. J. Sawyer D.D.S. 301 Fidelity Bldg Dayton O 2 yrs.

				Total Comm	Comm Paid	Note Reserve Dr	Cr	
40 4/11	Pid. O.T. # B2532 (B-9207)							
	Tube #1882 - (2660)							25% - 575.
	Trans B-9122							15% - 100.
	Liner #56702							12% - 545
	Accem.	681	55	162	81	32	56	7% - 1.10
Apr. 25	- Comm. less reserve							100% - 3.33.
	Special allow.	43				129	82	
41	Oct acct						8	14
	Apr "						8	14
42	Oct "			Final			8	14
	Apr "						8	14

J. H. Skelton D.S.C. Washington C.H. Ohio. 2 yrs.

			Total Comm	Comm Paid	Note Reserve Dr	Cr	
11/8/38	Model J. Gen						
	#	248 15	59 70		24 07		
	Spark Gap.	50 00	48 50				98% - 97%
			49 00				
12/5 1939	Ck. #888			41 32			1.50 sp. allow.
Mch 16	1/2 Comm.			42 06			
July 28 -	June acct	1/4 reserve.				60	
40	Dec acct	1/4 "				60	
7/13	June acct	1/4 "				60	
41 Mch 22	Delj "	1/4 "	Final			60	

E. A. Sherk M.D. 1208 Wayne Ave Dayton O. Cash.

			Total Comm	Comm Pd	Reg Dr	Res Cr.
12/28	SWD1-24-DeLuxe					
	# 10534z-					
	Unit # 0-2354					
1940	Tubes # 3785-3799	314 50	78 68			
1/6				78 68		
	overdraft			786		
	Comm Pd			7077		

C. P. Samsel M.D. 415 Troy St. Dayton, O. 18 mo.

			Total Comm	Comm Pd	Reg Dr	Res Cr.
40 1/19	"K" Ultra Violet					
	Lamp # A-37141	205 30	49 27		985	
1/24	ck # 10639			394z		
	May acct	1/4 reserve				246
41	Oct "	1/4 "				246
Mch 22	1941 "	1/4 "				246
	July "	1/4 "	Final			247

S. Fitler H. Riley M.D. Eaton Ohio.

				Total Comm	Comm Pd.	Res Dr	Res Cr.	
1938 2/25	"J" Galvanic							Cash.
	# 45352 Acan	251	15	62 79				
3/11	ck # 3181 Comm.				62 61			.18¢ allow.
'38 11/16	SWD1-24 # 10329z							
	2490; 2468							
	Unit # 0-2400	338	35	83 66				10% - 6.20 25% - 332.15
7/14	ck # 6147 Comm.				18 48			65.18 Sp. allow.

Sterryman C.K. M.D. Bellefontaine Ohio 1½ yrs.

			Total Comm.	Comm Pd	Reg Dr	Rec Cr.	
39 7/13	D# 105455		1 97				
	26760-26745	366 76	88 02		18 00		19T Freight.
7/22	ck# 6439. Comm			71 99			less 1%
	Dec acct					4 50	
	" "					13 50	
40	Refinanced						
1/14				55 08	13 77		
	May acct					3 44	
	Aug "					3 44	
	Nov					3 44	
41	Mch 22 Feby "		Final			3 45	

clinic.

E.M. Steele D.O. 22 Masonic Bldg Wilmington O.

1940			Total Comm	Comm Pd	Reg Dr	Rec Cr.	
	DSP20 # 43555						25%-1204.00
	Table # B-31620						20 - 51.20
	Tube #6865						15 - 185.44
	Bucky # A-29131						100. 50.00
	M. Meter #338						12- 20.50
	V. " #374						10 - 1.59
	Timer # 7592						7 - 6.60
				Sept account			
	Charge back —					1,109.26	
	Access.	1519 33	39 14		80 93		
7/13	Comm. Pd. ck# 14625			311 21			
41	Mch acct		1/4	reverse		20 23	
	Dec "		3/4	"		60 70	

Swerdfe. J.A. M.D. 2517 E. 5th St. Dayton Ohio 2 yrs.

			Total Comm	Comm Pd.	Reg Dr	Rec Cr.	
39 7/14	S# 105441						
	26501; 25910						
	Access.	365 10	87 62½		17 82		
7/21	ck# 6393-½ Comm.			35 65			less 1%
9/21	½ "			35 65			
	~~Dec acct~~	~~¼~~	~~XXXXXX~~			XXX	
	Jan acct	¼	Reverse			4 45	
	July "	¼	"			4 45	
41							
July 19	Jan "	¼	"			4 45	
	July "	¼	"	Final		4 47	

	Dr.	Cr.	Bal.
Sept. charge back.	227.28		
" acct		15.33	211.95
Oct-18- Dr Duckwall sett.		14.11	197.84
Oct acct		62.95	134.89
Nov-14- Dr McVay sett.		30.54	104.35
Nov. acct		26.69	77.66
Dec 5- Dr Ryan sett.		9.25	68.41
Dec. acct			
Jan. 14- Dr Novak sett.		13.86 -	

J. A. Surdyk M.D. 2517 E. 5th St. Dayton, O. 9 mo.

			Commission Dr.	Commission Cr.	Note Dr.	Res. Cr.
4/						
6/6	"CK" Quartz Lamp #C37109	230 00	57 50		8 63	
6/12	Comm. less reserve			48 87		
	Sept. acct	1/4 reserve				2 15
	Nov "	1/4 " "				2 15
4/	Jan "	1/4 " "				2 15
	Mch "	1/4 " "				2 16
		Final				

Taylor R.L. D.O. 3rd Nat'l Bk Bldg Dayton, O. 1 yr.

			Total Comm.	Comm. Rd.	Note Dr.	Res. Cr.	
40 7/12	"M" #106026						
	Tubes #27781-27801						
	Cable & Blocks.	364 50	91 12				
	Freight		2 65				See below
7/18				68 77			25 00
41	Oct acct	1/4 reserve				3 61	
July 19	Jan "	1/4 " "				3 51	
	Apr "	1/4 " "				3 51	
	July "	1/4 " "		Final		3 53	

J. W. Direy M.D. Anna. Ohio 6 ms.

			Commission Dr	Commission Cr	Note Dr	Reserve Cr.	
40 3/28	"M" S.W. #104791						
	Tubes #27590; 27601						
	Ind. cable & blocks.	364 50	87 48		17 80		
	Freight		1 50				
41	½ Comm. less reserve			35 59			
5/13	½ "			35 59			
	April acct					4 45	
	June "					4 45	
	July "					8 90	Final

Unger R.T. D.C. 1901 W. 3rd St. Dayton O. 2 yrs.

			Total Comm.	Comm Pd.	Res Dr	Res Cr.	
3/15	"O" R-#104986						
	25618; 25641	291 00	69 84		13 97		Less 1%
6/22	ck #5637 ½ Comm			27 93			
10/16	" 8193 "			27 93			
40	Dec acct	¼	reserve			3 49	
7/13	June "	¼	"	"		3 49	
41	Dec. "	¼	"	"		3 49	
July	July 22 - June "	¼	"	"		3 50	Final

Wm. J. Wickins Jr. Orr-Flesh Bldg. Piqua O. 18 mo.

			Total Comm	Comm Pd	Res Dr	Res Cr.	
12/14	"5" Short Wave						
	#10562						
	Tubes #26888-26795	272 30	65 62		13 12		
12/18	ck #9881			49 17			3.33. Spec Allow.
40	April acct					3 53	
41	Sept "					3 53	
Feby 19	Jan "					3 53	
July 22	June "		Final			2 53	

Jas. O. Whitmer D.C. 18 S. Cherry St. Troy O. 3 yrs.

			Commission Dr	Commission Cr.	Note Dr	Res. Cr.	
8/7	11-30-96-#13-18148						25- 1280.50
	Tube #2650 - Trans. #13 13397						20- 55.00
	Cont #13-10585 - Tuner #9840						15- 178.94
	and accers.	1665 49	46 19		97 38		100- 100.00
	Detroit acct (accers)	126 50	31 62		6 32		1Y. 20.50
							10- 2.70
							7- 8.85
							3 1/3- 19.50
2/14	Comm. less. rec.			364 54			
	" " " (Detroit)			25 30			
	Nov acct	¼	Reserve			24 34	
41	July "	"	"			13 04	
46	July " charge back		256.67				
9/24	Reinstate - Res. 46.99				18 98		

42 July Chg back - 256.67
43 Dec - Re Instate 21.70

April 20-1944 chg Back of 234.97 still stands.

Wonder J.O. M.D. Harries Bldg - Dayton, O. Cash.

			Total Comm	Comm Pd.	Reg.	Res.	
3/17	SWD1-24 # 105169						
	3B36; 3B14						
	Unit # A 34012	330 00	82 50				
3/23	ck # 3584 - Comm.			57 50			25.00 Spec. allow.

G. W. Yaeger M.D. 2018 N. Main St. Dayton, O. 2 yrs

			Commissions Dr.	Commissions Cr.	Rate Dr.	Reserve Cr.	
5/19	"S" Short Wave # 106673						
	Tubes - # 3449						
	Accrs	349 00	83 65		16 72		25 - 375.00
6/4	Comm. Jers reserve			669 72			10 - 24.00
	Spec. Allow.			200			
				649 72			
	Mar acct	1/4 Reserve				4 18	
12	Apr "	" "				12 55	
		Final					

Zindorf P.R. Dr. 2019 N. Main St. Dayton, O. 2 yrs.

			Total Comm	Comm Pd	Rate Dr	Res Cr.	
9/27	"M" # 106028						
	Tubes - 27784 - 27612	364 50	91 13		18 23		
9/30				72 90			
41	Mch acct					4 55	
	Sept "					4 55	
42	Oct "	Final				9 13	

Zindorf P.R. Dc. 2019 N. Main St. Dayton, O. 3 yrs.

			Total Comm	Comm Pd	Note Dr	Rec Cr	
10/31	"TF" 30-96 B-13225 #13-18068						25 - 1280.50
	Tube #2306 2415 Trans. #B-13222						20 - 51.20
	Timer #9689 Cont. #B-1054 fr						15 - 185.46
	And accessories.		1694.69	483 61		102 74	12 - 31.00
							10 - 1.86
							7 - 8.85
8/4/11				380 87			3⅓ - 15.00
June 19 - 42	May acct	1/16 reserve				25 68	98 - 20.82
	Feby acct	1/4 " "				25 68	100 - 100.00
	Mar "	1/4 " "				25 68	
43	May "	" "				25 70	xxxx
	May acct	Charge Back	107.10				

F

Elsie Kendall

415 Dudley Rd.

So. Ft. Mitchell. Ky.

Di-1-5-103

Kenneth Snook.

Mch - charge back 107.10

Dec - Reinstate 80.38











DIATHERMY THERAPY

SEVENTH
REVISED
EDITION

Published By
RESEARCH DEPARTMENT
H·G·Fischer & Company, Inc.
Physical Therapy Headquarters
2323-37 Wabansia Avenue
Chicago, Illinois

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Printed in U. S. A.

Form 535F

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H. G. Fischer & Company, Inc.

Seventh Revised Edition
Published August, 1931

PREFACE

APPRECIATING the need of establishing standard technics applicable to the treatment of the various conditions in which diathermy is indicated, especially among medical men who are just entering the physiotherapeutic field, we have attempted in this publication insofar as possible to supply this much needed information.

Many physicians and surgeons using diathermy today are pioneers in the field, and employ whatever technic they, through experience, have found gives the best results. These men have adopted procedures that may be regarded as standard. We find that the successful men, even where widely separated, have come to use practically the same general technic in their work, and in the preparation of this book of therapy, we have been careful to incorporate only that which has been adopted by a sufficient number of physicians as safe, reliable, and efficient.

While diathermy as an electrical modality is a constant element, the reactions of the human body differ widely in different individuals. Furthermore, the same individual does not react the same at all times, and in the use of diathermic energy, as in the administration of medicines, the physician must use both caution and judgment, study each case individually, and adjust his technic to suit conditions.

Neurotic patients often have an extreme fear of any electrical treatment, which they associate with electrical shock and high tension burns about which almost everyone has some knowledge. In treating such patients, the operator must endeavor to inspire their confidence by his attitude and make them understand that he is not carrying out an experiment, but that he knows exactly what he is doing and is confident of the results to be obtained. He should check his connections, the application of the electrodes, and the setting of the machine before starting the treatment.

While diathermy is doubtless as safe as any agent used in the practice of medicine and surgery, it is possible to abuse it and produce burns, or uncomfortable sensations to the patient. We have endeavored, in this book, by furnishing reliable information regarding the application of this physical agency, to remove all doubt and to inspire confidence.

It is our hope that by the publication of this Book of Therapy we will aid in the advance of physical therapy science.

Research Department,

H. G. FISCHER & CO., Inc.

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NOTE—All indications and treatments are arranged *alphabetically*, which makes the section of Diathermy Therapy *self-indexing*.

MEDICAL DIATHERMY

For convenience in therapeutic applications, Diathermy has been classified under two heads. First: Medical or constructive diathermy and Second: Surgical or destructive diathermy, the dividing line being where stimulation ceases and disintegration begins. There is no difference in the two types except in the amount of heat energy produced at a given point.

Medical diathermy is mild and produces an increase of physiological, or we might say, metabolic reactions, while in surgical diathermy the degree of temperature is so intensified that all metabolic reactions are destroyed and the tissues are blanched, desiccated, coagulated, or charred according to the intensity of the current.

Medical diathermy is applicable in the treatment of painful or infectious conditions where it is desired to increase the physiological reactions of the body for the purpose of combating infection, by increasing the phagocytic properties of the blood stream, and accelerating the absorption of disintegration products and debris. Heat also, has analgesic properties and except in cases where suppurative material is confined under pressure, medical diathermy is very useful for the relief of pain.

Physicians appreciate the value of the application of heat to the body and have used convective, radiant, and conductive heat, in many instances in addition to chemistry.

The methods employed for this purpose fail in most instances because they do not penetrate, but only heat near the surface. In speaking of Diathermy we speak of *conversive* heat (high frequency currents through the body)—heat from within—heat that is developed, by the passage of an electric current, within the tissues themselves, and this heat can be generated at any depth.



Fischer Hospital Portable Diathermy Unit, Type "G2" on Mobile Cart

As Chas. E. Stewart, M.D., says,[1] "In Diathermy the physician has at his service a method possessing a wide range of flexibility by means of which he can make thermic applications of varying degrees of intensity to almost every part of the body."

[1]Am. Jour. Phys. Ther., Jan., '27.

About twenty-five years ago D'Arsonval, a French professor, demonstrated that when an electrical current reversed its direction oftener than 10,000 times per second, muscle contractions ceased entirely. Since this time electrical currents of frequencies very much higher have been experimented upon, and these currents were finally named Diathermy currents by Nagleschmidt of Germany. Dia—thru and Thermy—to heat.

Then came various methods of applying Diathermy Currents and various voltages under which it was used. Three names applied to these Diathermy Currents still remain quite popular. They are, D'Arsonval, Tesla and Oudin. They are all essentially the same and the terms may well be discarded. Ordinarily D'Arsonval Currents are spoken of as fairly low voltage currents approximating from 1,000 to 5,000 volts. Tesla Currents often run as high as 25,000 or even 30,000 volts while Oudin is usually considered from 30,000 to 100,000 volts.

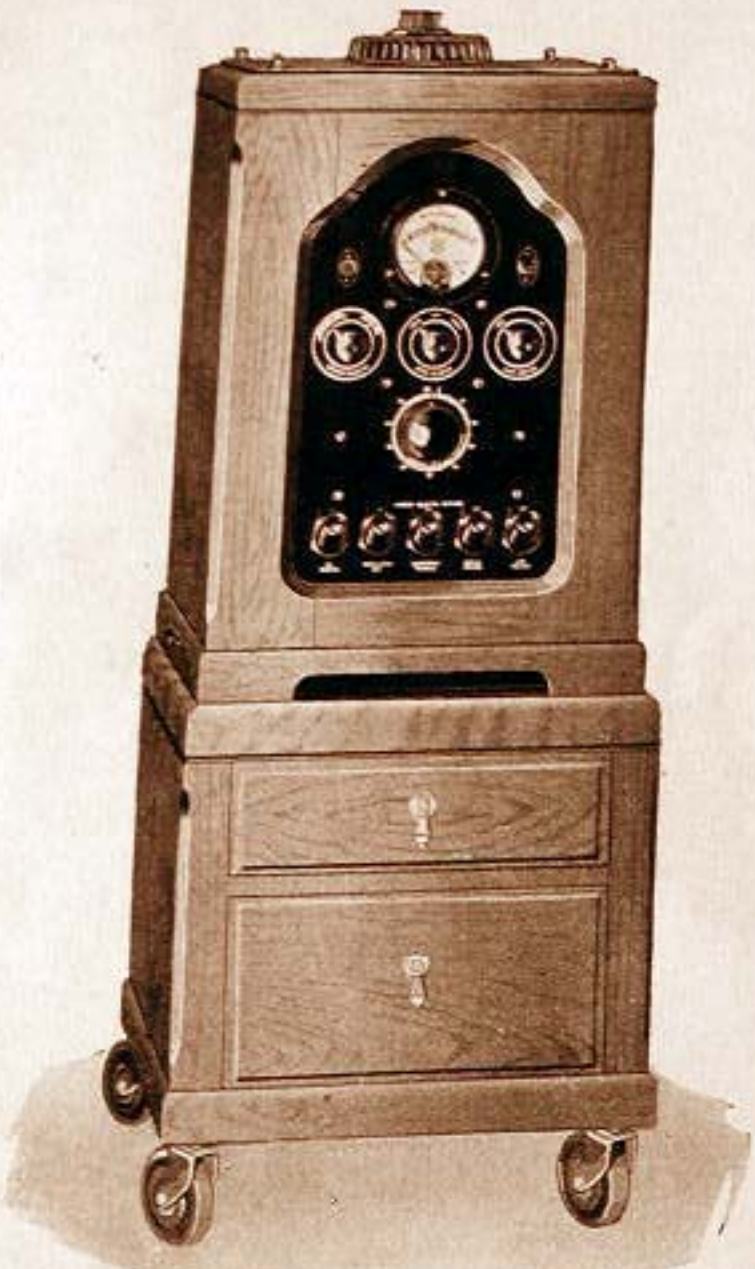
The sensation engendered by Diathermy within the human system, or within the part under treatment, is one of heat only. The circuit is under complete control of the operator and when properly adjusted is absolutely devoid of any faradic sensation.

Medical Diathermy is used to produce heat within the tissues within physiological limits, the object being to temporarily increase congestion and promote a more rapid flow of blood, the reaction following decreasing congestion with the resultant drainage of poisons from the affected area, all of which is accomplished at a comfortable heat toleration.

Medical diathermy is applicable in all instances in which the therapeutic effects of heat within the tissues is beneficial.

The ability to generate the heat *within the tissues* is the paramount advantage of Diathermy over any other method. In fat people the peripheral layer of fat acts as an insulator so that little or no benefit to the deeper tissues is ever produced by external applications of heat.

By Diathermy, we may administer heat to whatever depth desired and may intensify or decrease its concentration at will. Medical diathermy produces a vasodilatation of the arterioles and venules, thereby increasing the vascularity of the part. There is also an increase in the concentration of the hemolytic enzymes which increases the phagocytic activity of the white blood cells, thereby combating infection by nature's process and at the same time hastening the absorption of devitalized tissue and waste products.



Model "C-D-C" Senior Diathermy Cabinet

Quoting from Kolischer, Diathermy increases nutrition oxygenation, hastens the elimination of waste and toxic products and furnishes a better supply of the various substances that are locally required in combating infections. There is often a relaxation of other tissue elements, such as spasmodic muscles, tense nerves and similar conditions.

Edwin N. Kime, M.D., points out[2] that both medical and surgical diathermy in the hands of the skilled medical man are valuable adjuncts, and when administered with proper technic in suitable cases appear to be almost specific in many hitherto hopeless conditions. Geo. W. Funck, M.D., says,[3] when diathermy heat is applied to any part of the body, the tissues react in a certain definite way. It produces a local vasodilation of the arterioles, capillaries and veins, and a similar effect in the corresponding lymph channels; the result is an increased fluid irrigation of the area; more blood and lymph flows through in a unit of time.

Neymann states,[4] that after Diathermy the blood picture changes. Red blood corpuscles, white blood corpuscles and hemoglobin increase. Chemical examination of the blood reveals decided changes. There is an increase in the nonprotein nitrogen and uric acid content of the blood.

From what has been said, it would follow that Diathermy is beneficial in the following conditions:

1. Conditions requiring local increase of the blood supply.
2. Conditions requiring increase in rate of metabolism, oxidation, phagocytosis, antibody formation, and etc.
3. It increases the elimination of waste products.
4. It relieves tension.
5. It supports and maintains a healthy metabolism.
6. It relieves pain due to congestion.

[2]Indianapolis Med. Jour.
[3]Am. Jour. Phys. Ther., Oct., '29.
[4]J. A. M. A., Jan. 3, '31.

The general indications for Medical Diathermy are:

1. Chronic local debilitated conditions.
2. Acute and chronic inflammations.
3. Toxic states.
4. Neuroses.

As examples of these conditions, we might mention:

1. Chronic ulcers, varicose ulcers; eczema, the dry, scaly form; non-united fractures; trophic sores; chronic arthritis; muscular atrophy, etc.
2. Tuberculosis, pulmonary, bone, and gland; urethritis, prostatitis; metritis, cervicitis, salpingitis; otitis media; osteomyelitis; neuritis.
3. Pneumonia; pleurisy; arthritis.
4. Nephritis; toxic fevers and acidosis.
5. Idiophathic hypertension; psychoses, autonomic imbalance.

By the employment of properly sized and shaped electrodes and the proper technic, we are able to deliver to areas of any size, not only greatly varying degrees of heat but accurately measured dosage. This heating may be general or localized to small sections by simply varying the technic of application. The result is accomplished with no sense of shocking or so-called electrical sensations on the part of the patient; in fact, the patient should never feel any other sensation than that of the required, comfortable warmth.

Briefly, medical Diathermy produces internal heating (or what we might term an internal poultice), offers relief of venous and visceral congestion, creates capillary hyperemia, has marked analgesic properties, stimulates cells, glands, and the vasomotor nerves, and is used to exceptional advantage in:

Pneumonic infiltrations
Industrial injury cases
Absorption of callouses and deposits
Chronic Kidney conditions
Congestion of liver
Old skin fibrosis
Neuritis
Ankylosed Joint
Lumbago
Neuralgias
Sciatica
Myalgias
Orchitis
Endocervicitis
Epididymitis
Arthritis
Chronic Urethritis
Gonococcal infection
Traumatic injuries
Pelvic inflammation
Angina Pectoris
Muscular Atrophy
Bronchial congestion
And for the relief of pain

It is impossible to give a definite list of conditions for which Diathermy is available. Any such list, however long, would be sure to lack completeness. Diathermy is of value wherever heat

is indicated. The only way for the prospective user of Diathermy to learn how to supply it, is to keep in mind its general effects, and to keep in mind the indications in his patients for these effects. If he does that, he will discover new uses for Diathermy every day.

Diathermy applications are biterminal, and while on first observance the general technic seems exceedingly complicated, it is in reality very simple. Proper attention must be paid to the seemingly small details of an average diathermy application.

Diathermy dosage will naturally vary from as low as 50 M.A. up to as high as 6000 M.A. and over, to correspond with the type of case under treatment as well as the square inch surface area of the electrodes. There is an accepted rule that 500 M.A. for each 7 square inches of surface covered should not be exceeded.

Start the treatment with a very low milliamperage, that is, with the spark interrupter points adjusted almost closed, and increase the current gradually to the desired maximum, holding the current volume at that point for the duration of the treatment and then gradually reducing again to zero before throwing off the current. This will produce a thorough and even heating in the tissues.



Fischer Model G-3 Diathermy Cabinet

In the latest model Fischer Diathermy outfit all possibility of faradic sensation at any given point of voltage or amperage is overcome. There is no rheostat, choke or other primary control, on this machine. The control is obtained from an additional solenoid coil, loose coupled, and while the entire current is across the gap at all times, the volume is controlled by the adjustment of this loose coupled solenoid coil.

This serves the double purpose of control from absolute zero to maximum without a break in the circuit, and as the control is graduated, a precision adjustment can be repeatedly made at any voltage required.

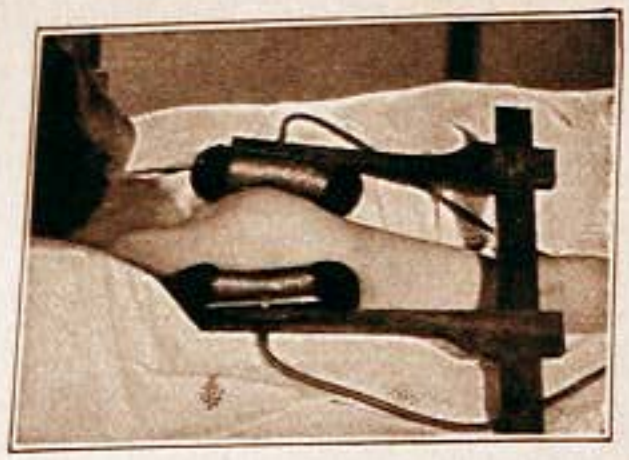
Contra Indications

Pus *without* drainage.

Pelvic area during pregnancy or menstruation.

Beware of areas of anaesthesia—or apply after sensibility returns.

EFFECTS OF DIATHERMY CURRENTS



Diathermy Clamp Applied to the Shoulder. Heating effect is apparent straight through.

When electrodes of equal size are applied to opposite sides of a limb or trunk, the heating effect will be apparently uniform straight through.

By using a large electrode on one side and a small electrode on the opposite side, the intensity of the resultant heat will be in exact inverse ratio of the square inch area covered. It is easily possible to concentrate so much heating under a very small electrode as to produce actual coagulation. Note the relative size of these squares:

If electrodes of the above proportions were placed on opposite sides of a limb, the heating effect under the four squares (Fig. A) would be four times as great as under the sixteen squares (Fig. B) because of the concentration of the same amount of energy on each.

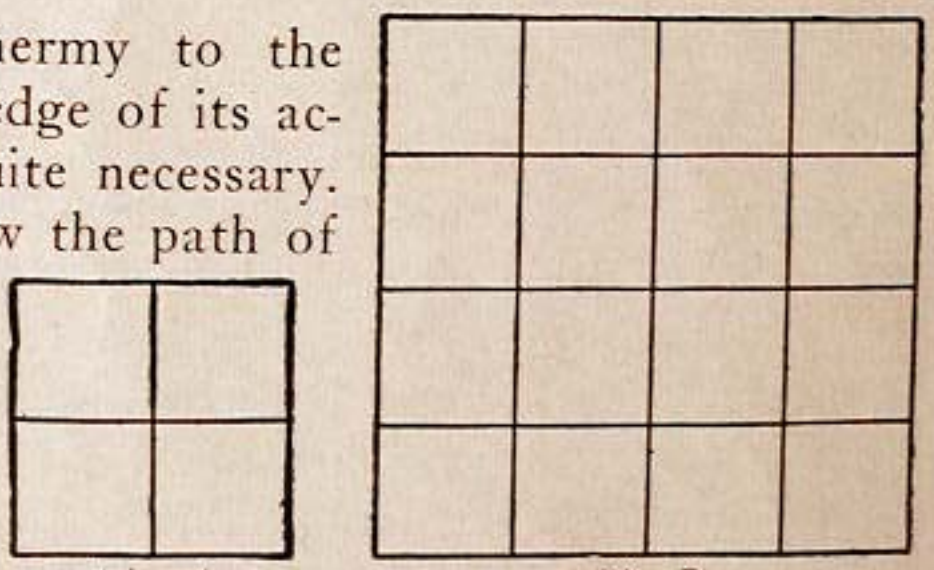


Fig. A

Fig. B

Before applying diathermy to the human body some knowledge of its actions on the tissues is quite necessary. Diathermy currents follow the path of least resistance when passing through the body.

The heating power of diathermy currents (high frequency currents) is not alone in the resistance of the tissues to the flow of the current, but also due to the fact that the tissues of the body between the electrodes completes a condenser by becoming the di-electric between the metal electrodes. These tissues, therefore, are additionally heated by the eddy currents which flow uninterrupted in all directions between the electrode plates.

When active pointed electrodes are used it is well to remember that the tissues immediately surrounding such active point will quickly coagulate. Depth and breadth of coagulation can be more accurately determined with biactive needles.

In considering the physiological effects of diathermy to the human body, we need but refer to Dr. Bier's famous work on hyperemia. He points out the inhibitory effect on bacteria—he also strongly points out the relief of pain, the absorption of disease deposits and the beneficial nourishment of the heated area.

All this is borne out by Crile's work in his study of the chemical effect on tissues and organs. Dr. Crile claims a 10 per cent drop in the chemical activity of the liver for every degree centigrade drop of temperature. He points out this danger during major operations and uses diathermy to help maintain normal temperature in such critical instances.

Experience by others has proven that wherever chemical physiology is retarded, that its chemical velocity may be restored by medical diathermy.

A diathermy treatment should be started with but a small amount of current. The volume should be increased gradually, arriving at the maximum amount of milliamperage in about five minutes' time. This technic means an even distribution of the heat and no trouble with hot spots at the electrodes. On the other hand, when starting the treatment with a great volume of current abruptly, practically all of the heating will concentrate near the surface right under the electrodes, with a resultant drying out of the conducting materials, water, soap lather, etc., that you may have applied, as well as the skin itself. Your patient will be uncomfortable and will complain of hot spots and pricking sensations. These conditions must be avoided. Starting the treatment with a moderate current and gradually increasing the volume—especially when using electrodes of unequal size—is absolutely necessary; otherwise the heating will be concentrated very noticeably at the surface immediately under the smaller contact.

Bone and scar tissue offer great resistance to the passage of diathermy; tissue and moist skin offer very little resistance. Muscle and bone retain the heating from the diathermy treatment for a long period, while most of the skin heating is dissipated by radiation; and the tissues immediately beneath the skin lose most of the heat through conduction by the dilated blood vessels.

To recapitulate: The following factors must be considered in giving a diathermy treatment:

Resistance of the skin
Amount and character of tissue between electrodes
Moisture of tissues
Density of tissues
Amount of circulating blood supply
Distance between the electrodes
Size of the electrodes
Tolerance of the patient
Milliamperage employed
Degree of temperature desired.

To sum up, always bear in mind that in the clinical effect of Diathermy Applications two factors enter: (1) the degree of heat maintained, and (2) the length of time of treatment. Also that chemical activity increases with every rise in temperature, and that pain, wherever located, is relieved due to hyperemia on the surface or deep seated.

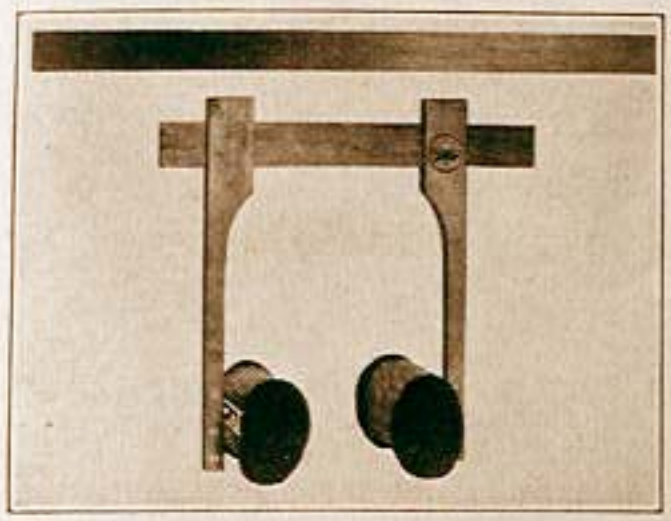
We repeat another important point. The rate at which heat energy is developed under an electrode 2 inches square will be four times as great as under an electrode 4 inches square, that is, with the same setting of the machine. By doubling the milliampere reading, say, for example, from 500 to 1000 M.A., we actually increase the heating energy by three to four times.

A Diathermy electrode, as well as electrodes for the administering of any other electrical modality to the human body, should be of bare metal. This metal may have a backing or support of a flexible material, as, for instance, a soft rubber sponge, but the point we wish to emphasize is that the element in direct contact with the skin should be metal and not some absorbent material. Absorbent padding soaked in saline solution or other conducting medium, may be employed, but there is always danger of such electrodes drying out during the treatment and losing their conducting value. There is even greater danger of blistering by steam, and it has been found that a water-soaked electrode of, say 3 x 6 inches, which has 18 square inches of surface area, would be active only for probably 6 square inches at the end of a 10-minute treatment, the fluid having all gone to one end instead of being evenly distributed.

Medical Diathermy when properly applied should always be soothing and at no time should it become irritating to the patient.

DIATHERMY ELECTRODES

Various materials are used in the making of electrodes for the application of these currents. *Sheet Block Tin* has proven by far the most successful all-around material. It is quite flexible, depending upon its thickness, and is therefore easy to apply. It can be cut with a scissors to any shape desired, and after used can be rolled out flat and used over and over again.



The Diathermy Clamp

Such metal electrodes, as well as the surface of the skin at the point of contact, should be moistened before application. Soap lather has been applied to good advantage; we list a special paste for this purpose. Warm tap water, to which has been added a bit of sodium bicarbonate, also is excellent. Distilled water offers very high resistance to the passage of any electrical current; tap water has slightly better conductivity; soap lather slightly better, Fischer Diathermy Paste still better, and sodium bicarbonate offers least resistance.

Fish Scale Mesh, when perfectly clean, makes an excellent electrode. It is easy to apply. It very readily conforms to any shape and when used with a lubricant it makes an exceedingly good contact, provided you limit the milliamperage to less than 100 milliamperes per square inch. When unclean, however, it causes hot spots. To keep this material clean have it acid dipped, and thereafter keep in alcohol when not in use.

Moist Pads such as are used for low voltage electricity are exceedingly easy to apply, but owing to the fact that the water will flow to the lowest point, dry spots will appear where the resistance will be high and the skin is sure to be burnt at such points.

Very thin, finely corrugated sheet aluminum is becoming popular. On the limbs, the electrodes are generally held from slipping with elastic bandage, wound around just tight enough to hold the electrode but not so tight that the natural swelling of the limb as a result of the heating will produce any constriction (as, for example, an ischemia). Since the regular elastic bandages are easily soiled, are spoiled by laundering, and are quite expensive, many operators make use of crepe paper bandages; these are quite satisfactory, and can be discarded after being used once.

The diathermy clamp is invaluable in many applications. Is instantly applied or removed; never short-circuits; may be used with several sizes of mesh covered sponge electrodes. A polished wood bar supports two sliding arms, also of wood, which hold the electrodes firmly in place.

Sandbags are invaluable for holding electrodes in place on the trunk, and very often on the limbs, and several sizes and shapes of sandbags should always be available in the diathermy room.

Never fail to determine the size and shapes of your electrodes, carefully. The indifferent electrode, that is on the opposite part of the body from which the greatest heating effect is desired, should always be of liberal size. There is no advantage in making your indifferent electrode small.



Sandbag

Never permit poor contacts or loose connections. Fully 90 per cent of all complaints as a result of diathermy treatments are the direct result of either improperly applied electrodes, or poor connections. A contact that is not firm will cause a prickling, burning sensation in every instance. This lack of proper contact may be at the point where the cord connects to the machine, where it connects to the electrode, or, even between the electrode and the skin itself.

In giving diathermic treatments, the operator must use care to keep the skin surface between the electrodes absolutely dry. Soap lather, damp elastic bandages, or even perspiration will often "short-circuit" the current to a sufficient degree to produce unequal heating effects within the tissues. Warm electrodes stimulate the sweat-glands, the skin becomes moist underneath the electrodes and good contact may be established. The only requirement is that the electrode be in contact with the skin at all points, as a space underneath any part of the electrode will produce sparking and discomfort to the patient.

Current volumes, duration of treatments and frequency of treatments will depend, naturally, on the type of treatment and the nature of the case. We will endeavor on the following pages to offer some assistance along this line.

It is very important to keep the patient's confidence at all times. To that end, work carefully, slowly, and methodically, in

order to avoid making little slips; an accidental spark that to you may seem trivial, will fill the patient with terror, especially if it is a woman.

Especially, if a long series of treatments will be required, it is more important that the patient leave the treatment room after the first treatment with confidence in the doctor and in his apparatus, than that a great deal of therapeutic progress should have been made at the expense of terrifying the patient and running the risk of his or her never returning. Many operators term their first treatment a "placebo" treatment and give it for the purpose of accustoming the patient to the routine.



Flexible Mesh Electrode

IMPORTANT POINTS IN GENERAL TECHNIC IN MEDICAL DIATHERMY

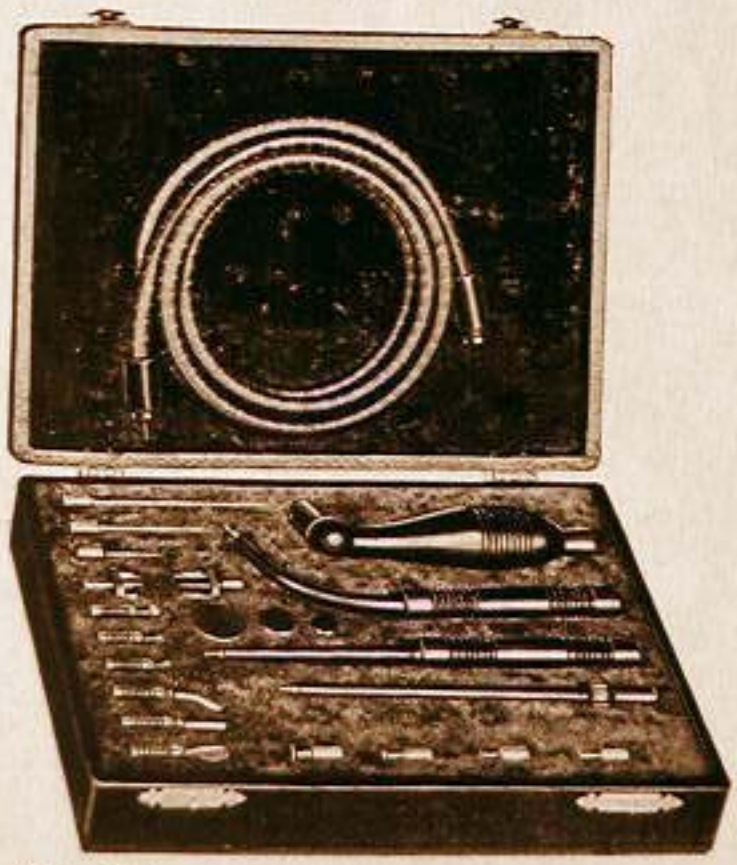
1. Have your diagnosis accurately in mind.
2. Have a definite idea as to how your treatment is expected to work.
3. Decide just where the maximum heat must be applied, and arrange the size and position of the electrodes to get it there.
4. Decide whether the heating is to be mild, moderate, or intense, and plan the current intensity accordingly.
5. See that the electrodes are well lathered, and in even contact, and firmly held to the part.
6. See that the connecting wires from the machine are firmly anchored and in no danger of becoming loosened, or pulling the electrodes out of position during the treatment.
7. Begin with a feeble current intensity, and increase very gradually to the desired amount, taking several minutes to reach it. Too much spark gap makes the patient uncomfortable; too much volume from the control lever works the machine inefficiently. Balance the intensity of the current by means of both spark gap and primary control lever. The Fischer "C-D-C" machine delivers a perfectly balanced current at all settings.
8. Err in the direction of insufficient rather than excessive current until the treatment has been several times repeated. Skin burns take long to heal, leave scars, and interfere with future treatments.
9. Do not destroy the patient's confidence by careless handling of things during the first treatment.
10. Do not leave a timid patient alone at the mercy of the machine; leave an attendant on watch, or arrange a switch so that the patient can shut off the current in case something seems wrong.
11. Do not apply diathermy over enclosed pus and fluid under pressure.

SURGICAL DIATHERMY
(Electrocoagulation)

Surgical Diathermy is the term given to the application of high frequency currents for the destruction of tissues by the heat produced through resistance offered by the tissues through which the current is passed. The degree of heat is increased to dessication, coagulation, or complete necrosis, as required. Surgical Diathermy kills the tissues by coagulation of the proteins.

Howard A. Kelly, M.D., Baltimore, Md., says[5] (diathermy coagulation), "The surgical diathermy conception is as positively and aggressively surgical as the time-honored scalpel, ligature and suture, and tends largely to replace the first two—for centuries the recognized badges of our profession. The fine point of the needle forms such an admirable, delicate, controllable instrument that it makes any surgical knife seem clumsy by comparison.

"Its field par excellence is that of the malignant growth which, by and large, it covers more effectively than any other surgical method. The object is to destroy quickly by heat, within a defined area, all the suspected tissues by a perfectly controlled voltage and amperage. We are all only too well aware of the awkwardness of putting one operation on top of another in the same area at a later date, and such secondary supplementary operations are rarely satisfactory or thorough on account of scar tissue and hemorrhage. By this new procedure there is no objection to a series of follow-up operations.

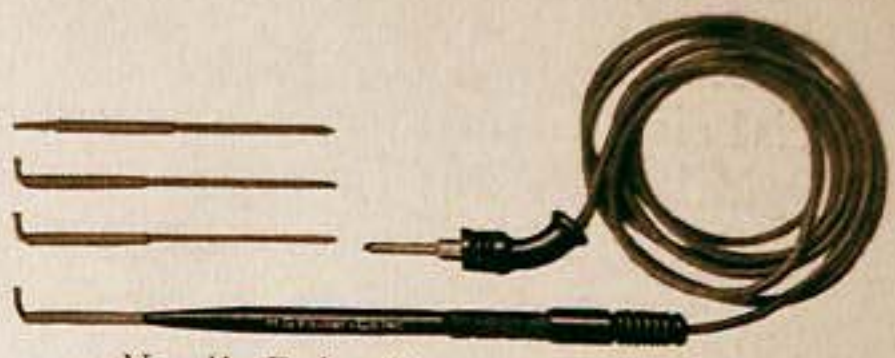


Set of Surgical Diathermy Electrodes in Special Case

"The value of this newer method is that it is quicker and more efficacious and in every way more attractive than our older procedures. It is a sort of long knife and fork manipulation which restrains the operator from direct contacts with the area under treatment. It dispenses largely with the time-honored but always objectionable ligature. With a mild antiseptic dressing the wound is cleaner and heals more quickly

[5] J. A. M. A., May 19, '27.

and it is usually far less painful. Hemorrhage is greatly lessened and controlled by applying the current to the vessel through the pointed forceps grasping it."



Needle Point Electrodes and Holder (Dillinger)

Gustav Kolischer, M.D., Chicago, Ill., says: "The superiority of the results of surgical diathermy, and the electro-coagulation of malignant tumors, is also based upon the collaboration of the reticulo-endothelial system. In the area around the coagulated structures, the so-called perithermic zone, there is always to be found an abundant invasion and neoformation of macrophages—easily demonstrable by intravital staining. These defensive cells not only attend to the particular destruction of the remaining cancer cells but are also instrumental in leading to the production of regulating ferments, bringing the riotous multiplication and intrusion of malignant cells down to a normal level."

This method differs from medical diathermy only in the fact that sufficient heat is produced to actually destroy tissue. It differs from cautery in that the heat is being electrically conducted by virtue of the resistance of the part to the flow of current applied and is not conducted inwardly from electrode due to heat conductivity.

Following this same thought, you will readily see that the temperature must be highest at the smallest electrode. Increasing the size of the inactive electrode (sometimes called the indifferent electrode) and decreasing the size of the active electrode brings about a condition where the temperature at the inactive electrode is practically normal (due to its comparatively large size) but the temperature at the small active electrode rises to the point of coagulation or, in the case of the surgical knife, to instant destruction.

In surgical work the aim is to produce concentrated heat at small areas via the needle, the knife or special electrodes of various shapes, for the immediate removal of tissue—for coagulation and sloughing, for sealing blood vessels. These can all

be accomplished with lessened danger of transplantation of bacterial elements by diathermy than any other known method. The surgical diathermy current can be used not only to destroy tissue, but also to stop hemorrhage.

Surgical Diathermy or electro-coagulation is used to advantage in malignancies, in fact it is superior to other methods in that what would be otherwise inoperable growths are successfully destroyed; the blood and lymph coagulate, the vessels are sealed and infecting organisms destroyed.

Tissues or growths to be destroyed by electro-coagulation must be accessible; that is, the active electrode must be placed in actual contact.

The major advantages of surgical diathermy, or, as we shall term it hereafter in this publication, "electro-coagulation," follow:

Tissues are coagulated to any desired depth.

Operations are bloodless and leave sterilized wounds.

The blood and lymph channels are sealed, lessening the danger of metastasis in cases of malignancy.

Tumors otherwise inoperable may be safely removed.

Speaking of these advantages, Disraeli Kobak, M.D., says: "Points of advantage as demonstrated by the experience of those familiar with this technique are: (1) Immediate destruction of the neoplastic cells in situ; (2) the carrying of the heat, by the current, to a depth in the tissue beyond that actually treated, thus assuring the destruction of any malignant cells which have been lying beyond the area which actually appears to have been involved; (3) the practical elimination of either primary or secondary hemorrhage, as the blood vessels are thrombosed beyond the area of destruction; (4) there is practically no risk of spread of metastatic elements through either the blood or lymph channels; (5) the minimum formation of contractile connective tissues."

Electro-coagulation is used to advantage in:

Destroying growths and infective granulomata of the skin and mucous membrane of the mouth, nose, pharynx, tongue, larynx and oesophagus.

Cancerous conditions—sarcoma, and carcinoma.

Destruction of diseased tissues and benign new growths.

Tumors of the uterus and bladder.

Endocervicitis.

Vascular tumors.

Chronic and malignant ulcerations.

Superficial lesions—warts, moles, naevi.

Keratosis. Thickened skin by disease.

Electro-coagulation is similar to medical diathermy in the fact that the application is usually bipolar. The active electrode is the small point or disc which is placed in direct contact with the diseased tissue, or the tissue to be removed, or it may be a needle, either single or multiple, or any size of small disc, fastened to an insulated handle. The indifferent electrode is usually a large metallic plate to cover a large area of skin surface (large enough so that there will be no danger of destroying healthy tissue), which is placed on the body somewhere adjacent to the point of operation.

The indifferent electrode is of sheet block tin, and should be liberal in size, preferably 8 inches square (or round), or larger.

When employing electro-coagulation the nature of the case in hand and the character of the parts involved will aid in determining whether the direct contact method as described in the foregoing, or keeping the active electrode at a distance from the growth and sparking, is desired. The latter (referred to as Fulguration) produces a rapid coagulation, but only on the immediate surface, and is preferable for small superficial lesions.

The indifferent electrode must be bound or held in the desired position in such manner that it cannot move during operation. The small active electrodes are seldom moved with the current on. When a knife type electrode is employed it may be moved slightly in the desired direction, but the tendency on the part of most operators is to proceed too rapidly, and insufficient coagulation at some point will result. Never attempt to hurry electro-coagulation. Proceed slowly and methodically and be assured of finished results, paying more attention to the blanching of the tissues than to the reading on the milliampere meter.

EFFECTS OF ELECTRO-COAGULATION

Illustration No. 1

A piece of lean beef, 2 inches square and 3 inches thick, was placed on a flat metal sheet as the indifferent electrode. The 3/4 inch circular disc (catalog No. 1323) was placed in firm contact with the center of the top and a current of 700 milliamperes was passed for 1 minute, followed with 1200 M.A. for another minute. Result: An evenly coagulated mass of tissue, white in appearance, extending 1 inch on the surface and 1/2 inch deep. No evidence of burning or charring.



Fig. 1

Illustration No. 2

The 3/4 inch disc was placed in contact, as above, with another piece of beef, and approximately 4000 milliamperes passed for one full minute. Result: A charred crust 1 1/8 inches wide on the surface, and extending down almost 1/4 inch. Below this hardened section was a coagulated mass down another inch, tapering off in a cone shape.



Fig. 2

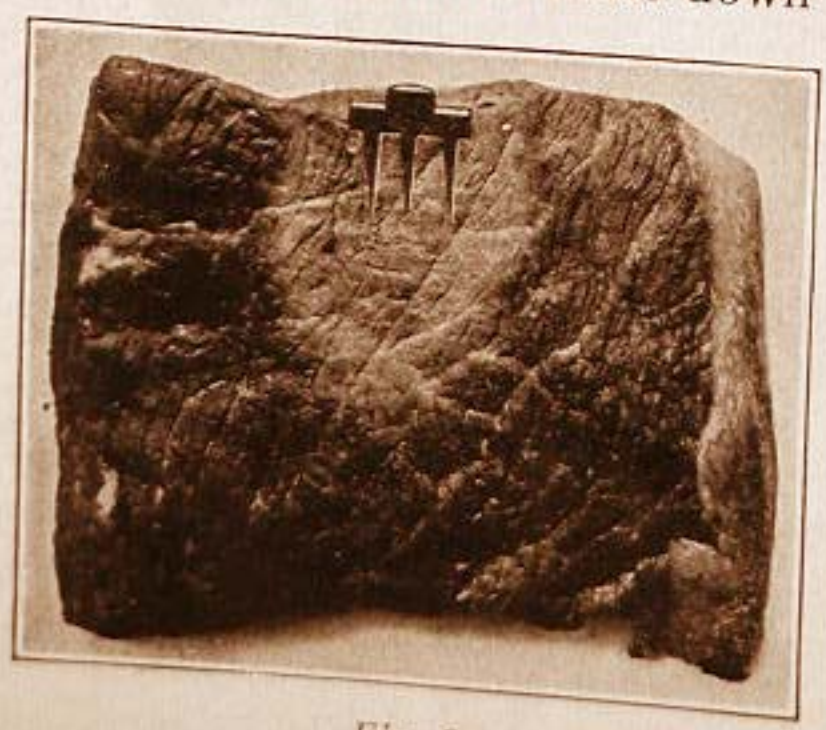


Fig. 3

Illustration No. 3

A larger piece of beef measuring 3x3x2 1/2 inches was used in this experiment. The 5-pronged multiple needle electrode was forced down into the center until the flat section rested on the

meat proper, and 1100 milliamperes passed for ½ minute, followed with ½ minute of 2000 M.A. Result: An evenly coagulated white appearing mass of tissue, extending 1⅜ inches deep and 1⅛ inches wide. No charring.

Illustration No. 4

A piece of fresh lean beef 2¾ inches square by 2 inches deep was placed on the indifferent electrode, and the single needle No. 1308 plunged 1 inch down from the top. A heavy current 2300 milliamperes was passed for 1 minute. Result: A burned mass, charred black where the electrode had made contact, and thoroughly cooked clear through to the bottom and ⅞ inch wide.

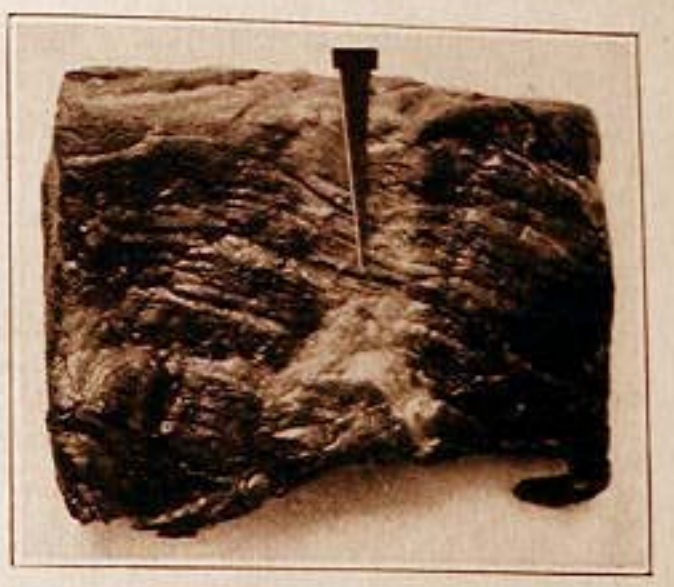


Fig. 5



Fig. 4

Illustration No. 5

The same size piece of beef was used as described under figure 4, and the same electrodes. Current was turned on more gradually—starting at 600 milliamperes for ½ minute, followed with 900 M.A. for the same length of time. Result: An even coagulation, ⅝ inch wide and 1 inch deep. No charring, and the line of coagulated tissue clearly defined.

ELECTROCOAGULATION CAUTIONS

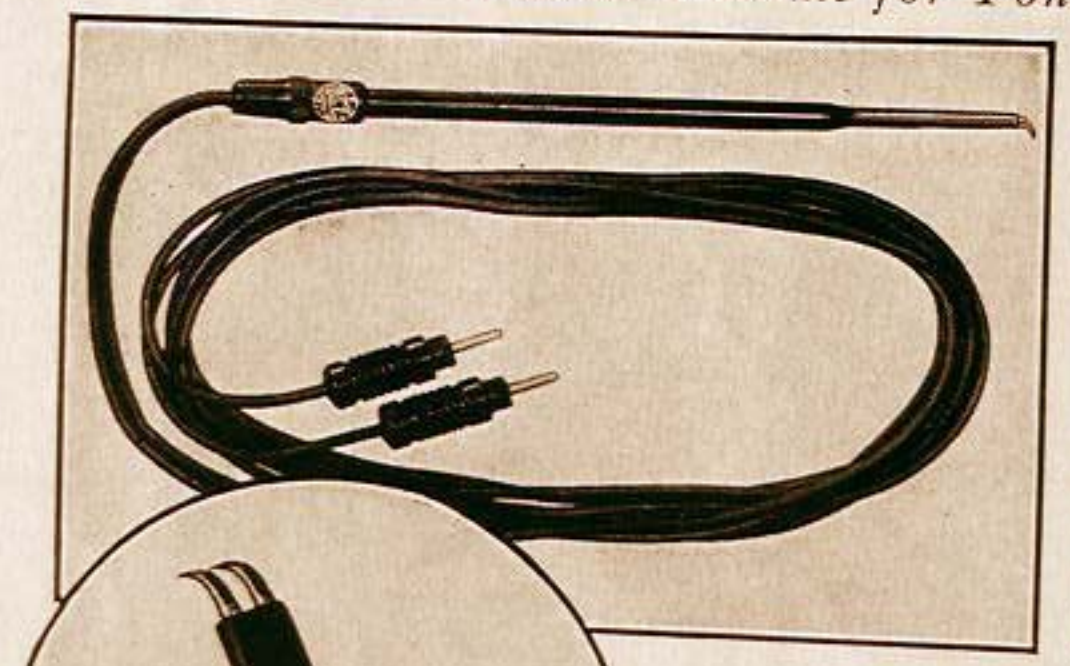
1. Be sure that the indifferent electrode is properly applied, firmly fixed so that it cannot move, and good connection made.
2. If ether anesthesia, or other inflammable gas, is used, be sure that it is a safe distance from the field of operation. Do not use a high frequency machine in the same room with ethylene anesthesia.
3. As far as practicable, avoid the larger veins and arteries when using electrocoagulation.
4. Be cautious when operating around bony structures as there is always a risk of destroying the periosteum.
5. Start every operation with the thought that too much speed may be the cause of possible failure when the operation might have been successful if more time and care had been taken.

BIACTIVE COAGULATION TECHNIC

Most minor surgical diathermy applications are made with a large inactive or indifferent electrode which is placed on a convenient part of the body near the point of operation, and a smaller flat, ball or point active electrode. The varying resistances of the tissues between these two electrodes often makes it difficult for the surgeon to properly gauge the amount of current required, and always leaves him in doubt as to the exact depth of the coagulation.

If, for example, the indifferent electrode is placed on the opposite side of the body from the seat of operation, a higher voltage is required than when the electrodes are placed nearer to one another, and it will be found much more difficult to control not only the extent in area but the depth of coagulation as well. All this has led to the present day bipolar or biactive types of electrodes. The advantages of this new type are that one may limit the coagulation to smaller areas, may exactly determine its depth, and in addition the very low voltage current required is under much more accurate control, this being especially true when supplied with a modern, delicately controlled outfit.

Biactive Technic for Tonsils



Biactive Tonsil Electrode

In this newer technic two active (biactive) needles, blunt points or blades are placed closely together in one holder. In the new Biactive Tonsil Electrode these points are separated by only 2 M. M. These points are embedded into the tissue to the desired depth. A delicate *low voltage* current is turned on, resulting in practically no coagulation beyond the outside of the needles but producing complete coagulation between the needles and to their entire depth, thereby limiting the coagulation not only to the limited area de-

sired but to the exact depth required. See pages 117, 118 for further technic.

Biactive Technic for Cervical Disorders

In the Ende-Cherry Electrode, designed for the destruction of the epithelial lining of the cervical canal, two narrow monel metal plates are mounted parallel to one another in a compressed bakelite supporting frame. This latter is very important for two reasons, the bakelite and monel metal must form a compact mass permitting perfect sterilization, and to accomplish this, tremendous pressure is required in the making of the electrode. But this is not the only important factor, the material used must be of the highest quality to prevent all possibilities of arcing across resulting in the forming of carbon on the electrode. The voltage required for the treatment is very low, making an absolutely safe application. Coagulation is produced between these blades and the depth of coagulation regulated by the time of application. The instrument is rotated back and forth with the fingers through an arc of about 180° with the fingers for a length of time varying from five to ten seconds, resulting in the lining of the entire canal being evenly destroyed to a predetermined depth. For further technic see pages 51 to 55.

Biactive Technic for Turbinates

Biactive coagulation technic is employed when applying diathermy coagulation to the turbinates. Two needles paralleling one another are mounted in a bakelite holder, and when properly applied coagulation again is maintained to a very narrow area. Several technics have been advocated for this work, but the method used by Dr. Beck and by Dr. Sinsky seem to have proven wonderfully successfully. In the method used by them, the foot-switch is used and after contact is made is depressed for a second only. Then further contacts are made above, below or posterior as the size of the turbinate may require, each one requiring but a very short application. See pages 124 and 125 for further technic.

MONOPOLAR DESICCATION

The term "fulguration" was formerly applied to what we shall refer to as monopolar desiccation. This is a dehydrating process usually employed in the removal of lupus vulgaris, warts, moles, etc.,—superficial lesions. No indifferent electrode is used; application is made from the higher voltage (unipolar) high frequency current instead of bipolar diathermy outlets.

These applications may or may not be painful depending on the depth and area of the lesion under treatment, but it is generally advisable to employ a local anesthetic. Many operators find an indirect application better than this direct monopolar treatment. The indirect method is obtained by placing a metallic electrode somewhere on the body near the site of operation, connected to the high voltage, high frequency terminal, and the pointed electrode, not insulated, is held in operator's hands.

The patient may hold a metal auto-condensation handle firmly in both hands to make connection to the proper outlet on the machine, but the resistance of the wrists and arms must be taken into consideration and more current employed than where the plate electrode is placed closer to the point of contact of the active electrode as first described.

Another indirect method, bipolar instead of monopolar, is obtained by connecting the auto-condensation pad or cushion to one of the diathermy outlets, and the active electrode to the opposite diathermy pole. The patient may either sit or recline on the pad or cushion, and the active electrode is held in an insulated holder in the operator's hands. Application to the growth or lesion is made exactly as described under the indirect method, but sparks will be shorter, hotter and more caustic, because more milliamperage is obtained by this method. This method may be used for actual coagulation procedure.

The needle or pointed electrode is held firmly in the operator's fingers and may either be placed in contact with the spot to be removed before the current is turned on, or the current turned on first and the needle then applied.

When employing the indirect method, current goes from the patient to the needle in the operator's hands. The amount of current is limited by the capacity of the operator. The application is less painful than the direct method; the operator will feel no sensation of currents, no ill effects will result, but the penetration will be less than when employing the direct method. This is the method of choice in treating moles and naevi.

Do not touch your patient during a treatment, as the shock at the point of contact will be disagreeable. Be sure that you use a wooden chair or wooden table. Never place the auto pad in contact with metal. You will find from experience that you will be able to pass a great deal more d'Arsonval current through a stout patient than through a thin one. This is just the opposite of the effect obtained in administering medical diathermy, as an obese person will take less diathermy milliamperage at a given setting of the controls on the machine than a thin one.



Auto-condensation Couch Pad

You should always recommend that your patient drink a great deal of water during a series of auto-condensation treatments. See that he drinks a glass of water immediately preceding each treatment. One of the most important features of an auto-condensation treatment is that your patient must be fully relaxed and made just as comfortable as possible.

Patients with exceedingly high blood pressure, and with a slow pulse, should be carefully watched during and after treatments.

The treatment of hardened arteries, walls lined with calcareous deposits, must be undertaken in a systematic way if lasting results are to be obtained. To lower the blood pressure too suddenly in these conditions is very dangerous.

During the menses it is inadvisible to use any high frequency treatments, but on the contrary, in cases of suppression, auto-condensation may be used as a stimulant.



Auto-condensation Couch Cushion

It is well to place the patient's hands on a pillow or large book when using a metal handle, in this way keeping the hands away from the body proper so there will be no danger of sparking. Caution your patient not to drop this metal handle with the current on, or even relax the hold, as resulting sparks will be sufficient to cause a severe burn.

Do not use auto-condensation in advanced arteriosclerosis or in extreme old age.

HIGH FREQUENCY

High frequency vacuum and non-vacuum electrode applications are not as widely used as in the past because the effect is only superficial as compared to the far deeper auto-condensation and diathermy treatments. However, high frequency electrode applications are quite clearly indicated in infectious skin diseases, as well as infections in the orifices which can be reached with the electrodes.

High frequency currents:

Dilate the blood vessels
Increase local blood supply
Increase oxidation
Increase elimination
Increase lymph circulation
Promote absorption of exudates
Liberate ozone

These applications are used in the treatment of:

Skin ulcers
Local debilitated conditions
Localized edemas
Painful localized conditions
Blepharitis
Lumbago
Uterine disease
Tonsillitis

When the glass vacuum electrode is properly connected to the high frequency terminal on your machine, that is, with the aid of the proper handle and conducting cord, and the switch closed, it does not always illuminate with the familiar violet colored glow.

If current does not immediately pass thru the electrode, grip the glass with the bare hand to warm it, or increase a bit the volume of current passing.

When an electrode becomes what we might term "stubborn" and will not light up, shut off the machine, leave the controls as they were but remove the heavy cord from the active pole and remove the electrode from the high frequency handle. Hold the electrode firmly in the bare hand. Start the machine and then touch the glass electrode itself to the active post, and unless the tube is punctured or otherwise defective, it will glow properly. Then shut off the current, connect the cord, handle and electrode to the machine as before and you should have no further trouble.

* * * * *

Metallic electrodes directly connected to the diathermy current are far more effective and will produce better results than the glass vacuum tubes.

Vacuum electrodes do not administer ultra-violet rays to the patient.

There is no such thing in physiotherapy as a "Violet Ray."

DIATHERMY THERAPY

An Alphabetical List

of

Indications and Treatments

ADHESIONS



Application of Electrodes in Adhesions

Adhesions, if not too old and involving the larger ligaments, can be handled to advantage with diathermy. 20 to 30 minutes every day, or at least three times a week, with current to patient's tolerance, is advised. Such treatment may be followed to advantage with sine wave.



Adhesions—Massage

While diathermy cannot be expected to remove organized adhesions, especially fibrous bands usually encountered in the abdomen, or pleuritic adhesions of long standing, this agent will, in the majority of instances, relieve the pain and favorably influence muscular spasms (peristalsis). The treatments should be mild, an average of 600-1200 milliamperes being sufficient.

ADENITIS, CERVICAL

Indirect diathermy is the method of choice in Adenitis. The patient is placed on the auto-condensation pad, which is connected to the highest voltage post of the machine, and treatment is given by the indirect method, the operator using his fingers for the other electrode. Diathermy should not be applied if suppuration is pent up. X-ray treatment and ultra-violet are valuable aids.

ADENITIS, INGUINAL

See Buboes, p. 40

ADNEXITIS

Martin S. Sichel, M.D., Portland, Oregon, in discussing the use of diathermy in pelvic infections, says,[6] "Ditmer in 1921 reported the largest series of cases treated by diathermy. Of 937 cases treated, he reports anatomic restoration of the adnexae in 372, or 39.4 per cent; subjective cures or improvement in 447, or 47.3 per cent; while 115, or 12.1 per cent, were improved. Cumberbatch and Robinson in England report forty-one cases of adnexitis with pelvic masses treated by diathermy. Thirty-three, or 80 per cent, completely recovered; six were partially relieved or relapsed, and two were unrelieved."

ALBUMINURIA

Albuminuria being a general term, diathermy is applicable only when indicated by the cause or pathologic condition involved. In functional (cyclic) alubuminuria, of course, diathermy has no direct indication. In the renal forms diathermy has a distinctive therapeutic value.

When due to nephritis with hypertension, autocondensation treatments are indicated. From 500 to 600 M.A. for 20 to 30 minutes. In cardiorenal conditions with edema, it is advisable to treat over the liver and kidneys, employing about 1,000 M.A. for 30 to 40 minutes. In this condition diathermy may also be applied across the thighs. This general diathermy application will increase the red blood count very perceptibly. Long narrow electrodes measuring about 3x7 inches, are placed on opposite sides of the thigh, either laterally or A.P. Just a moderate amount of current (from 500 to 600 M.A.) should be given daily or at least three times a week for about thirty minutes.

AMENORRHEA

See Diathermy in Gynecology, pp. 70 to 74.

Diathermy to the female pelvis is indicated in this condition, preferably with the Chapman vaginal electrode. The following technic has been described in above article, but do not use excessive milliamperage. About 1500 milliamperes is sufficient. The treatments should be given about three times per week, and supplemented by general irradiations from the air-cooled ultraviolet

[6]Med. Sent.

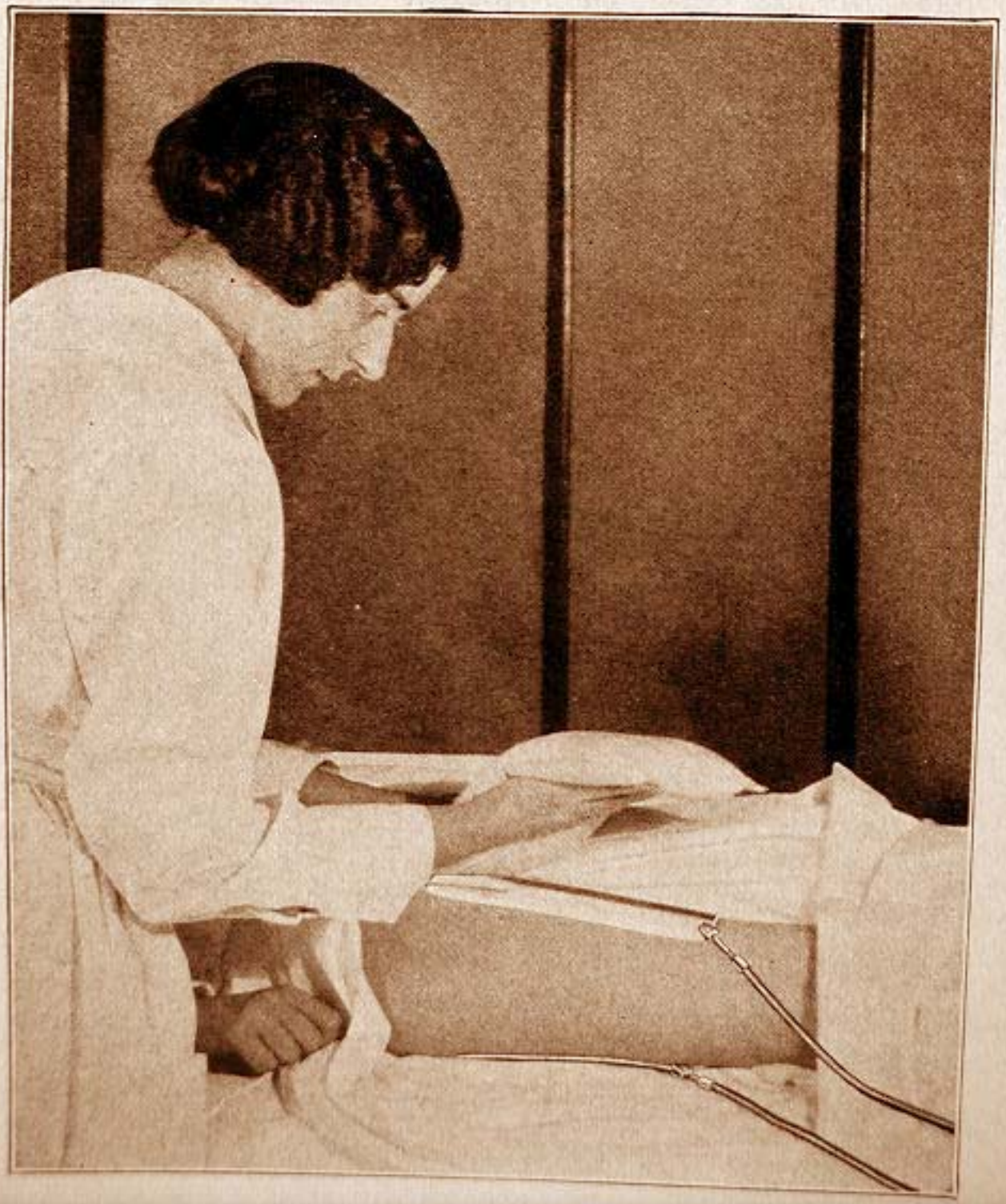
lamp, and by the administration of a ferruginous tonic and arsenic. Calcium and phosphorus are also useful in the treatment of this condition. If intra-vaginal treatments are contra-indicated, because of unruptured hymen, etc., a mesh or block-tin electrode may be applied anteriorly above the pubis and posteriorly over the sacrum with satisfactory results.

ANALGESIA

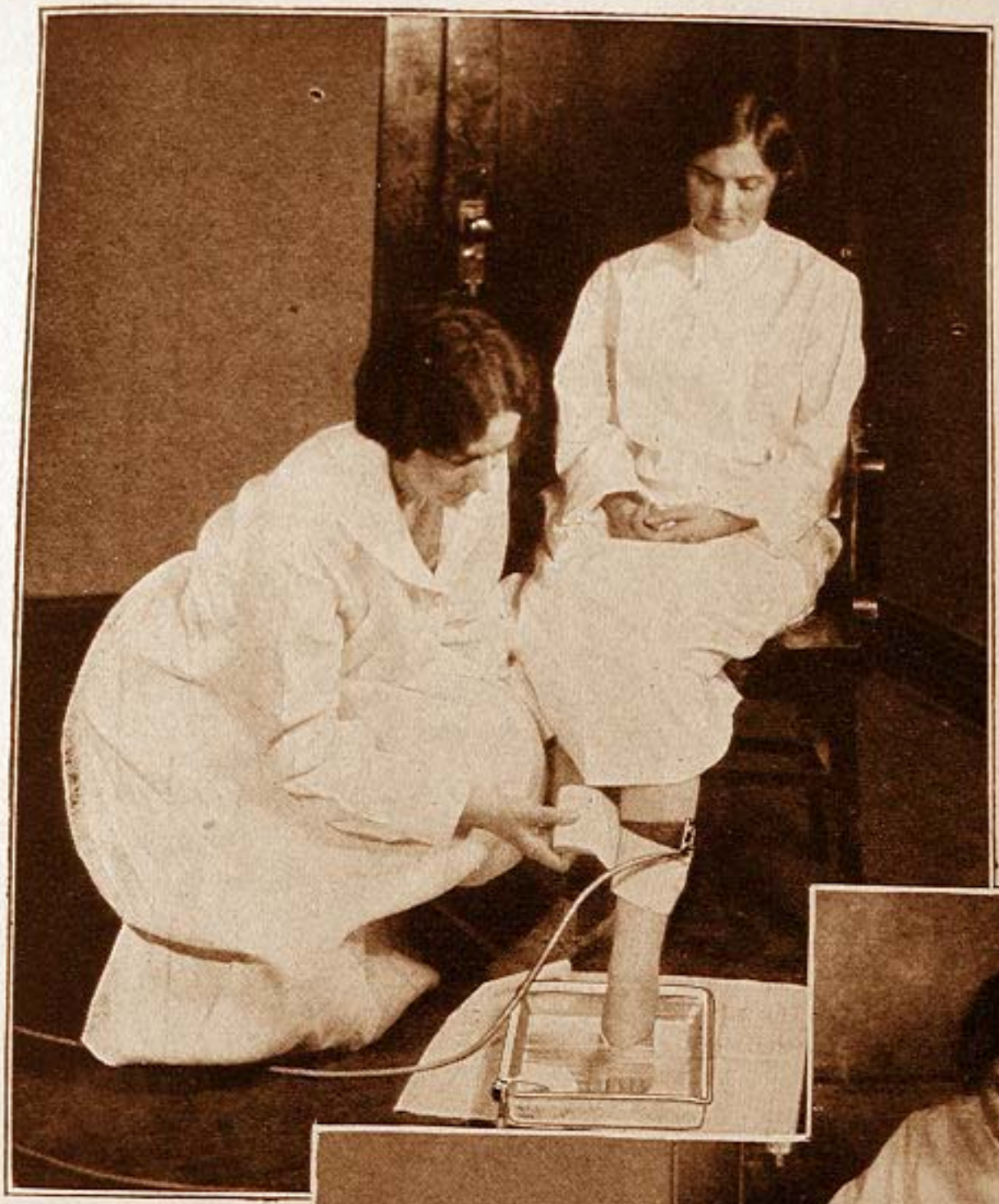
As a general proposition diathermy should not be used in any condition marked by an impairment of the sensory nerves. On account of the inability of the patient to experience pain, diathermy in conditions associated with analgesia is contra-indicated, as a severe burn might result.

ANEMIA, SECONDARY

Diathermy to the long bones is a useful adjuvant to other methods of treatment.



Left — Application of Electrodes in Anemia



ANKLE, DIATHERMY TO

At Left—Cuff electrode above ankle, foot immersed in basin containing ½ in. of water in which other electrode is inserted. Elastic bandage being applied.
Indications: All painful or inflammatory conditions of foot and ankle.



ANKLE, DIATHERMY TO

At Right—Treatment of ankle by diathermy, using two electrodes, one on either side of ankle, held in place by elastic bandage. 700 to 1000 milliamperes for 20 to 30 minutes.

ANEURYSM

Diathermy may be employed to relieve pain caused by an aneurysm, but has no direct effect on the course of the disease. Dr. W. W. Blackman of Atlanta, Ga., states[7] in commenting on an interesting case report, that diathermy treatments relieved the severe attacks of pain. The lowest voltage that will produce a smooth-flowing current across the spark-gap should be used, and the amperage raised cautiously. Some men claim that 100 milliamperes is sufficient while others use as high as 1200. The physician should not entrust this treatment to an assistant, but should keep in constant touch with the patient during treatment. Electrodes of approximately the same diameter as the depth of the tissues to be traversed should be used. Treat ten to twenty minutes.

ANGINA PECTORIS

Careful diet and abstinence from all undue exertion are important. During the paroxysms it is essential that the spasm and constriction be controlled. The medication generally favored is nitroglycerine in large doses. Diathermy directly to the affected region is excellent, and may be employed two or three times a week as a preventive, as well as in emergency. Use large block tin electrodes directly over the heart and on the back. Employ the minimum dosage that will give relief, 400 to 1000 M. A., for 10 to 12 minutes. Ultra-violet radiation also is indicated.

ANGIONEUROTIC EDEMA

Medical diathermy has proved valuable in the treatment of this condition. The treatments should be given daily and the amperage elevated to skin tolerance. Treat for from twenty to thirty minutes, using large block tin or mesh electrodes.

ANKYLOSIS, FIBROUS

Apply diathermy by means of half-cuffs above and below the joint, or directly through the joint, followed by massage.

ANUS, FISSURE OF

Walter Zweig says[8] "Diathermy is used in a large number of cases of deep fissures, and since the use of this kind of therapy was introduced, there was never a need of surgical interference. Diathermy can be given in the office to ambulatory patients. After-treatment is unnecessary, so patients can continue to follow their vocations. It is not possible to indicate a current which is

[7] So. Med. & Surg., Nov., '27.
[8] Wiener Klinische Wochenschrift, Jan. 21, '27.

applicable to all cases. This must always be determined for each case. But at all times the treatment must be begun with very small currents.

"It is interesting to note the almost complete anaesthesia of the mucous membranes treated with diathermy. This anaesthesia of the treated parts causes complete stoppage of the sphincter spasm which is the main cause of the difficulty to cure an anal fissure. Another observation shows that the wounds treated with diathermy require an abnormally long time for epithelium reformation. The wound is not healed before 4 to 6 weeks. But there is no objection to this slow healing since the patient does not feel any pain."

According to H. A. Kelly and G. E. Ward[9] surgical diathermy methods are efficacious in the treatment of pruritis ani, fissures, fistulæ, external and internal hemorrhoids, and rectal polyps. The healing following destruction of diseased tissues with high frequency electric currents is usually prompt and with little or no pain. The operations are almost bloodless and are most frequently performed under local anesthesia.

ARTERIO-SCLEROSIS

Diathermy, combined with the general treatment, may be used to advantage, especially in the early stages. The patient is given autocondensation treatments of 20 to 30 minutes duration, daily, lying on the autocondensation pad and holding the autocondensation handle. The current is advanced very gradually to 300 milliamperes; do not exceed this until you are sure the patient will react favorably to more. Under favorable conditions as much as 700 milliamperes may be given. At the conclusion of treatment, the current is shut off very slowly. Contraindications are hypotension, low systolic and high diastolic pressure. Be cautious about lowering the blood pressure too rapidly in these cases.

ARTHRITIS

Unquestionably the most important feature of the diagnosis and treatment of any case of arthritis is the discovery and the removal of the underlying causes.

The acute stage frequently follows exposure to cold and dampness, and these conditions are sometimes erroneously accepted by the patient as the cause of the disease. As a matter of fact, they have merely served to bring the trouble to a focus.

[9] Int. Jour. Med. & Surg., 41, 3.

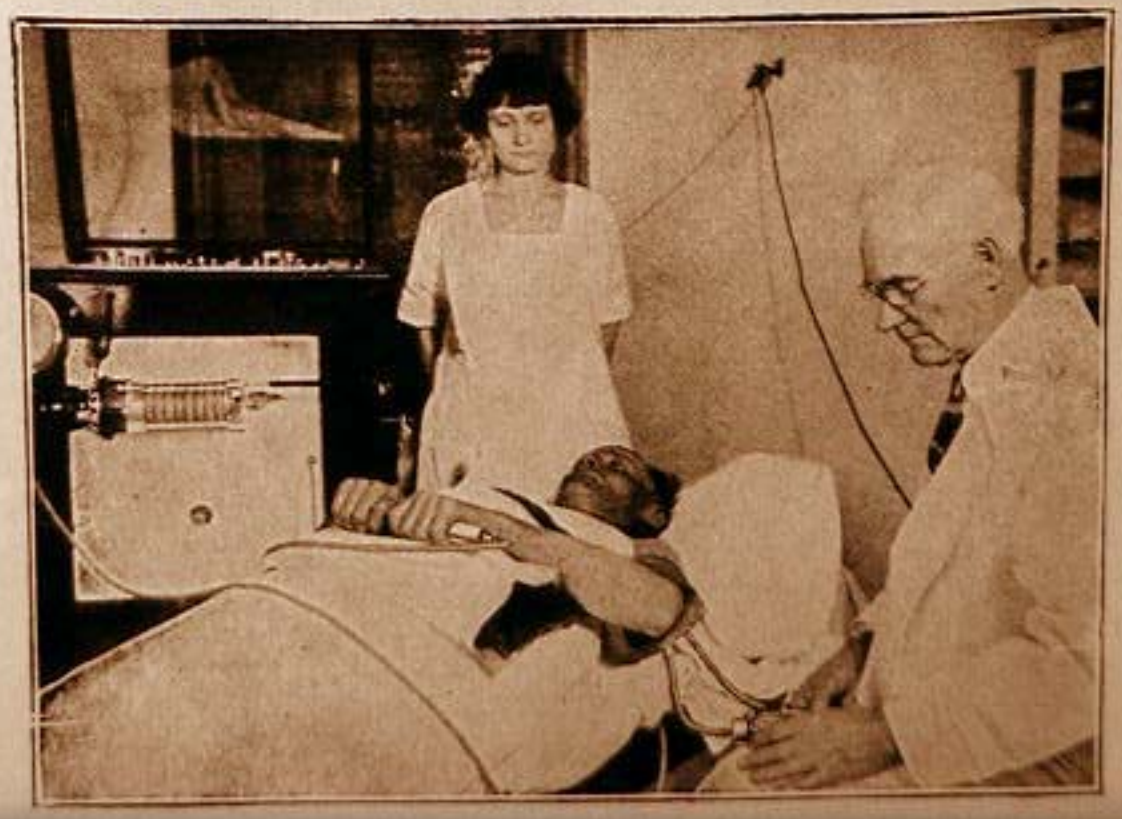
ATONY

Medical diathermy is indicated in the treatment of impoverished tissues, however, if there is an impairment of the sensory nerves, great care should be exercised to prevent burning. The main value of diathermy lies in its effect on the vascular system. Freshly oxygenated blood is drawn to the part and the metabolic exchange proceeds more rapidly. Treat thirty to sixty minutes daily, using just sufficient current to produce a pleasant sense of warmth within the tissues. Apply electrodes as in Arthritis, (pp. 33, 34).

AUTO-CONDENSATION

For auto-condensation treatment for hypertension, the patient lies supine on the auto-condensation pad, which pad is connected to one terminal on the diathermy machine, and grasps the large metal handle which is attached to the other diathermy terminal. The patient's position is illustrated below. Remove any of the patient's clothing that may contain metal fastenings. During treatment, the patient's hands should be supported on a small pillow, to prevent sparking.

Below—Auto-condensation for high blood pressure. Pressure is being taken at intervals as treatment progresses. Bipolar current, 600 milliamperes for 20 minutes. Treat daily. In the presence of heart and kidney complications the auto-condensation treatments are often not borne well by the patient. The physician should keep in constant touch with his patient during the treatment, and not leave these cases to the care of an inexperienced technician.

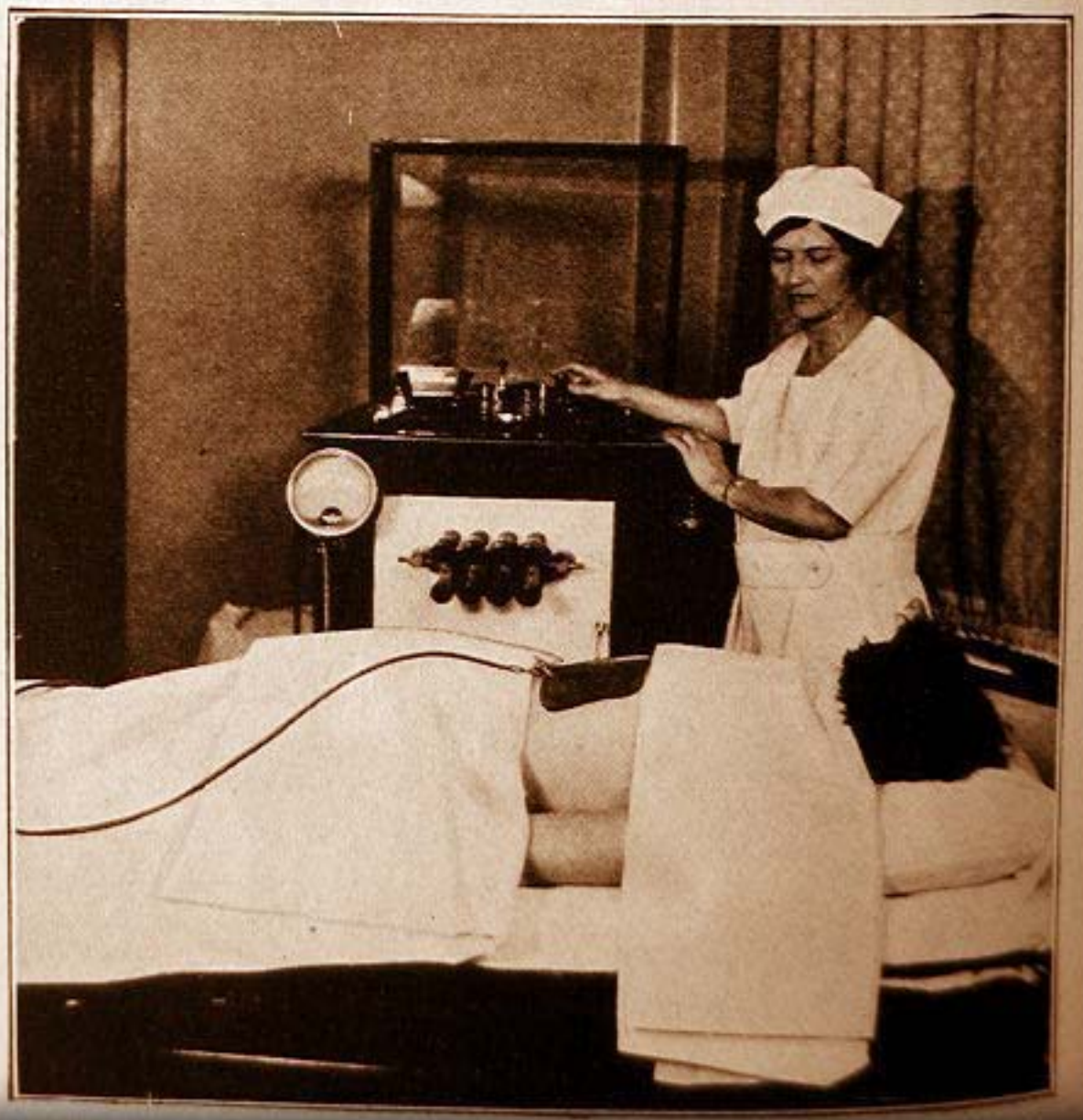




AUTO-CONDENSATION—Cont.

At Left—Recently reports are had of physicians obtaining satisfactory results by substituting a 7 in. by 9 in. metal electrode over the chest for the hand electrode. 300 to 700 milliamperes for 20 minutes.

At Right—In hypertension associated with chronic interstitial nephritis, beneficial effects may be obtained by placing the patient prone on the auto-condensation pad, and a 5 in. by 7 in. metal electrode held in place by sandbags, over the kidneys. 500 to 750 milliamperes for 20 to 30 minutes.



AUTO-CONDENSATION—Continued



At Right—Pleasant auto-condensation treatment for the neck. Patient seated on pad, other pole of bipolar current passing through operator's fingers to neck.

BACK, DIATHERMY TO

This treatment is of great value in spasticity and rigidity of the muscles of the back, or in fact for spasticity or rigidity of any muscles. Not only will these abnormal conditions be overcome by the application of diathermy, but the pain and tenderness attendant upon these conditions will soon be remedied.

It is good practice to apply mild surging sinusoidal treatment or hand massage to the affected muscles after the application of diathermy. It will be noticed that the tenderness on pressure that the patient complains of before the treatment, is practically eliminated after the first treatment. If there is any return of the tenderness in the forty-eight hours following the treatment, it will be nothing in comparison to what existed before.

BACK, DIATHERMY TO—Continued



The illustration shows how two large mesh electrodes are placed over the abdomen and under the back, with the larger one on the abdomen. Bipolar current to patient's tolerance for 20 minutes.

BLADDER TUMORS

Howard A. Kelly and William Neill, Jr., speaking of electrocoagulation say[14] that they believe that this method affords an extraordinary facility for dealing with tumors of the bladder without an incision, through the open cystoscope, in the male as well as in the female, and that in this way it will be possible to desiccate the bases of all pedunculate tumors and destroy them as a rule at a single sitting. Such a procedure simply calls for dexterity in the use of a cystoscope and in introducing a long well insulated needle to be brought into contact with the base of the tumor or to be plunged into it.

[14] Urol. & Cut. Rev.

BRAIN AND SPINAL CORD, CHRONIC DISEASES OF

F. Kraus says[15] that diathermy not only has the effect of producing hyperemia and absorption, of alleviating pain and killing bacteria, but it also stimulates the functional activity of the organs.

A striking improvement in central paresis of the extremities has, for instance, been observed during diathermy treatment of the corresponding segment of the spinal cord. Sagittal diathermy of the head stimulates the function of the diuretic center in the midbrain. The increase of diuresis reaches its climax 24 hours after diathermy treatment.

As is demonstrated by the histories of 14 patients, striking results have been achieved in 15 to 20 sittings by diathermy of the head, as intensive as possible, but at fairly long intervals (application of electrodes according to choice, no risk involved) especially in cases of post-encephalitic shaking tremor, tic douloureux, encephalitis lethargica, paralysis agitans, chorea minor and in spastic heimplegia of various etiology (diphtheria, apoplexy, etc.).

BRONCHITIS, ACUTE

See Pneumonia, pp. 98 to 101—technic is same.

BRONCHITIS, CHRONIC

Chas. E. Stewart, M.D., says[16] that diathermy is of value in bronchiectasis and in chronic bronchitis. The agonizing paroxysms which characterize bronchial asthma are frequently relieved by the use of diathermy to the chest.

Make sure that the condition is not one of incipient tuberculosis. Diathermy treatments should be given through the region of the affected bronchi. Treatments should be mild, long, frequent, and continued. Also treat the patient's general condition by diet, rest and tonics.

Electrode of block tin 6x8″ over the upper dorsal spine, and a small electrode about 5x6″ over the affected area anteriorly. Start with short treatments—not over 15 minutes—of about 500 M.A., and this may be increased later to as much as 30 minutes.

[15] Medizinische Klinik, No. 50, '29.
[16] Am. Jour. Phys. Ther., Jan., '27.

BUBOES

Diathermy may be used to good advantage in an effort at aborting the progress of the inflammation. Failing in this it may still further be employed to hasten resolution by bringing an oversupply of blood to the inflamed glands. Treatment should be discontinued at the first sign of softening or suppuration, and the pus evacuated. Radiant and ultra-violet light should be used for subsequent treatments.

Dose of diathermy is moderate tolerance for the patient for thirty minutes daily. The active electrode should be applied directly over the inflamed gland and should be slightly larger than the area to be treated. The indifferent electrode should be large and should be placed as nearly opposite the active electrode as possible.

BURSITIS

Diathermy applied daily, followed by gentle massage and manipulation, furnishes a form of treatment from which one may confidently expect prompt relief from the pain and normal restoration of function within 2 to 3 weeks.

It is best to give very moderate treatments only for the first few days. In chronic bursitis longer treatments running up as high as 25 minutes, may be employed.



Showing use of Diathermy Clamp in applying Electrodes to Knee

If only a moderate amount of fluid is present, absorption quite readily takes place. If absorption does not occur it should be aspirated under strictly aseptic conditions.

Following treatment, as in a knee or elbow, the part should be snugly bandaged with an elastic bandage.

CANCER

It is held by most physicians and surgeons that cancer is curable in most cases when discovered before metastasis has occurred. The danger of metastasis is much less when Diathermy is used than in operations with the knife, since diathermy seals the blood vessels and lymphatics, thereby lessening the chance of spreading the malignancy at the time of operation.

Surgical diathermy is the method of choice of a very large number of surgeons in the treatment of cancerous growths. Among its advantages are accuracy of control, immediate relief of pain, thorough and immediate sterilization of the wound, absence of shock, practically no hemorrhage, little danger of secondary hemorrhage, much less danger of extension and metastases than in use of the knife. Small lesions are removed quickly and painlessly by this method; in large operable lesions it has all the advantages mentioned above; inoperable cases, so-called, surgical diathermy permits the surgeon to operate in otherwise inaccessible locations, and in cases of extensive vascularity and involvement where the sealing of lymphatics and blood vessels is essential.

George M. Wyeth, M.D., of New York, says that the advantages of diathermy are (1) Decreased danger of metastasis and likelihood of recurrence. (2) Alleviation of pain. (3) Practically no hemorrhage. (4) Practically no surgical shock. (5) Accuracy of dosage; current under absolute control of operator. (6) Sterilization of wound incidental to treatment. (7) Patient's postoperative condition generally satisfactory leading to quick recovery and good cosmetic result.

J. Thompson Stevens, M.D., Montclair, N. J., says,[17] "As compared with excision, diathermy coagulation has the enormous advantage of destroying the malignancy before it is removed. It is impossible to overestimate the value of the fact that with this method the growth is removed as a dead mass instead of as a mass of viable cancer cells."

Joseph K. Narat, M.D., Chicago, Ill., says,[18] "Surgical diathermy sterilizes the zone of potential invastion about the original site of the tumor and decreases the possibility of dissemination of malignant cells. The degree of destruction and the depth of penetration of the electrothermic energy can be regulated with great exactness. Hæmostasis is secured easily, as the

[17] Phys. Ther., June, '28.
[18] Arch. Phys. Ther., X-Ray Rad., Jan., '28.

bleeding vessels are sealed with the electrode. No suturing is required."

H. H. Bass, M.D., Durham, N. C., says,[19] "The chance of a metastasis developing from the operation is negligible. The cancerous mass is first surrounded by a coagulated circle, extending well into healthy tissue to the depth desired. Scissors are used in this coagulated circle to separate the healthy from the diseased tissue. After this is done, the lesion is thoroughly coagulated and removed by curet and scissors. It is well to coagulate the crater superficially to control hemorrhage. The operation is best done under a general anesthetic. The operation can be stopped and the anesthetic readministered until the work is completed. The remaining coagulated tissue will separate and can be removed in about one week, bone will sequestrate and is ready for removal in about six weeks.



Fig. A

CAULIFLOWER EPITHELIOMA

Successfully removed by surgical diathermy. Illustration A shows side view of the growth; B, same patient after operation showing wound healed.



Fig. B

Treatment of Cauliflower Epithelioma

The large indifferent electrode is attached firmly to the back, between the shoulders. Use local anesthetic, one-half of 1 per cent novocaine solution to which is added 1-1000 adrenalin solution. Active (needle) electrode is placed in contact with the tissues and current turned on. As tissue blanches, needle is pushed slowly forward in the tissue until destruction has occurred to the desired depth. Current is then turned off, the needle removed, and adjacent areas similarly treated until the operation is completed. Milliamperes, 700 to 2500, to be gauged by size of the lesion, tissue resistance and current delivered by the individual machine. Indications, all epitheliomata. Contra-indications, none. After-treatment, sterile dressings, X-ray or radium therapy, actino-therapy.

[19] Arch. Phys. Ther., X-Ray, Rad.



SKIN CANCER

The above illustration on the left shows a small skin cancer treated by "cancer paste," resulting in severe skin necrosis and rapid spreading of the process. The right illustration shows the same patient completely healed following treatment by surgical diathermy.

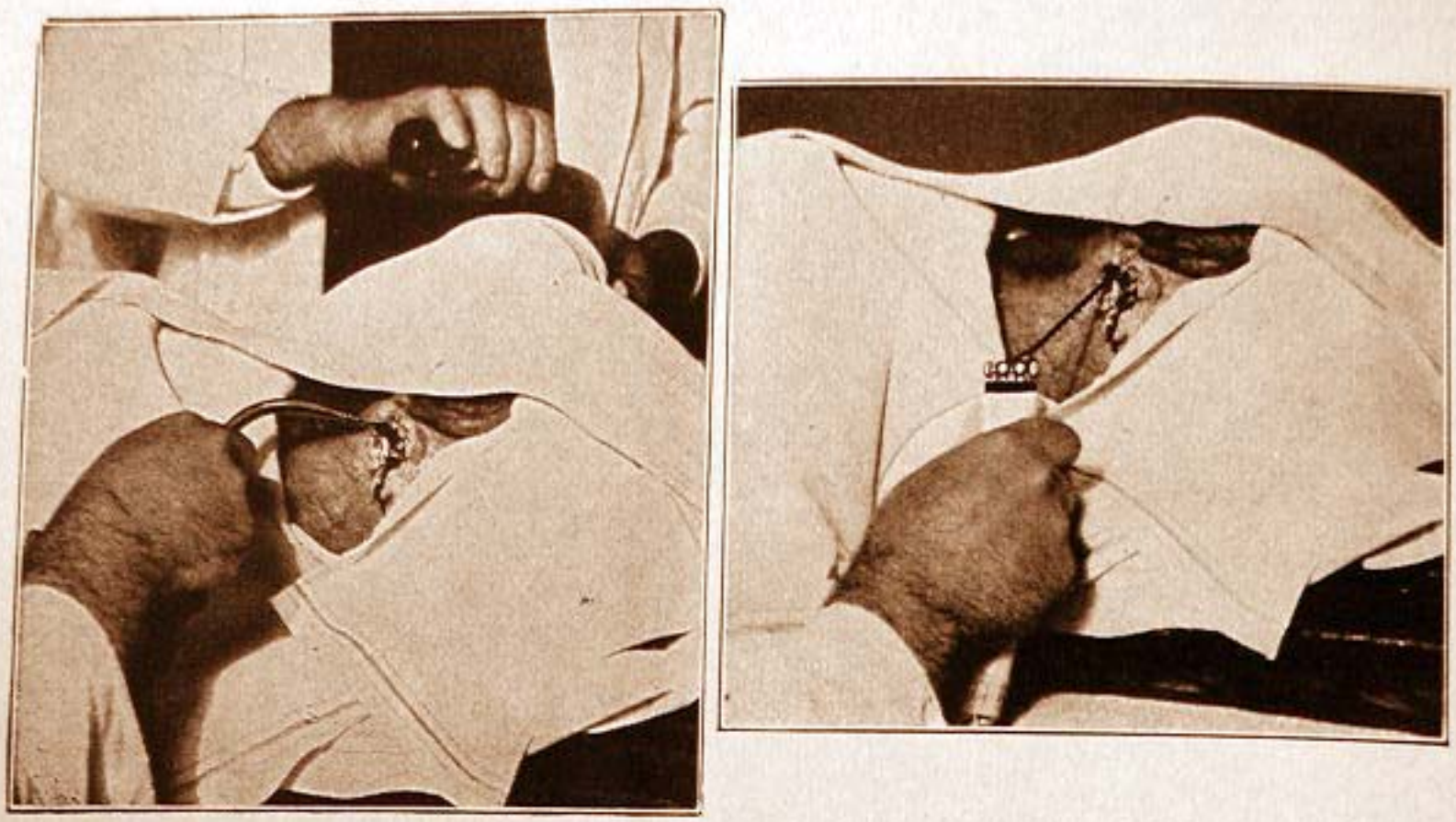
Treatment

Surgical diathermy used to remove malignant tissue, technique as described on preceding page. Also X-ray, skin cancer dosage, and actinotherapy, 3 to 10 minutes daily.

CANCER OF THE TONGUE

W. D. Harmer points out[20] that diathermy has now been in use in the treatment of cancer of the tongue for about seventeen years. The results that have been reported by surgeons in all parts of the world are so encouraging that there can be no doubt it is one of the best methods of treatment that has so far been devised. If the operation is properly carried out by the bloodless method there is no danger of disseminating the growth. Certainly it is easier to operate by this means than with the knife. The treatment can be carried out in a shorter time, and there need be no handling of the tissues. Complications are also less frequent than after cutting. Thus there is less shock and toxemia. The absence of pain is remarkable, and allows of easier swallowing. The sloughing that results is harmless. Many cases which would be considered inoperable by ordinary means can be relieved, if not cured, by the method—in fact, it may be the only means of sterilizing a painful septic sore. Even where life is not prolonged, the existence of the patient may be rendered more bearable.

[20] Brit. Jour. Surg., 15, 60.

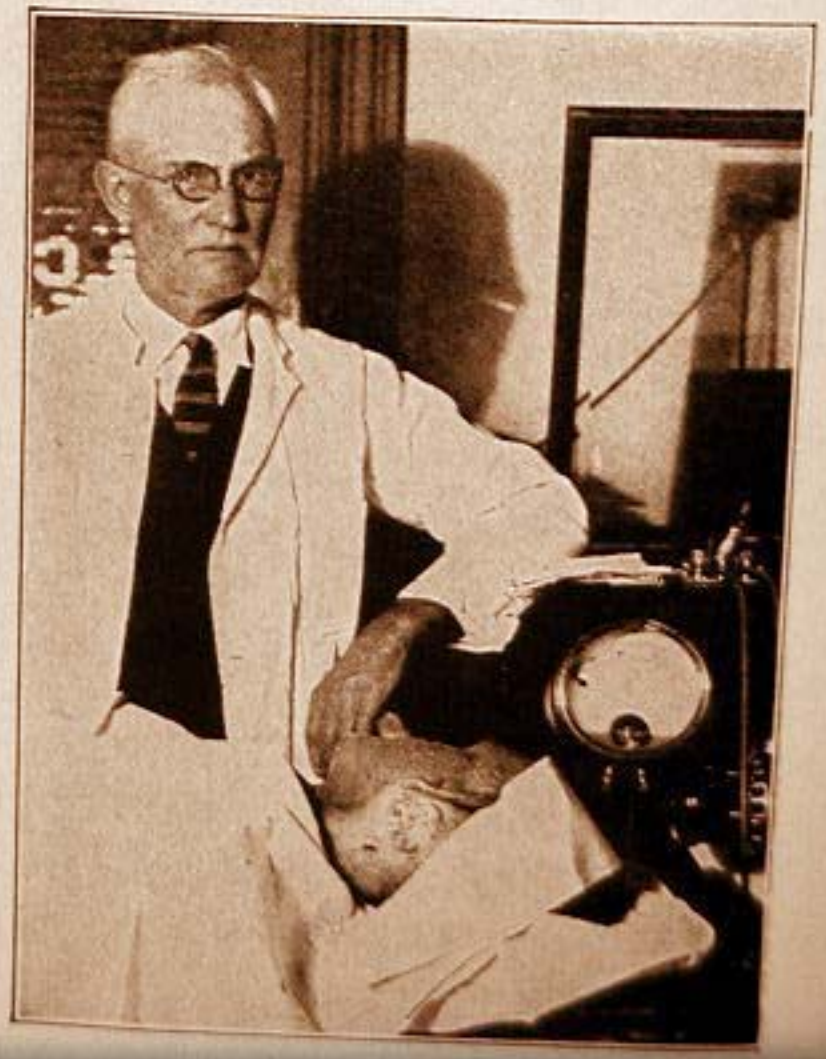


CARCINOMA

Above, at left, destroying cancerous tissue by surgical diathermy, under chloroform anesthetic. Above, at right, fulguration of cancer (using electro-cautery). Below, illustration of large cancer developing in left mastoid region.

Treatment

Fulguration and surgical diathermy, large indifferent electrode attached firmly to back, suitable small active electrode from Fischer Electrode Set. Anesthetic, chloroform. Milliamperes, 700 to 2500, depending on size of lesion, resistance of tissues and machine used. Post-operative treatment, X-ray and sterile dressings. Duration of post-operative treatment, indefinite. Indications, all accessible malignant growths. Contra-indications, none.



CANCER, PHARYNGEAL

D. McKenzie,[21] advocates diathermy in the treatment of both eradicable and ineradicable pharyngeal cancer. Its value lies in its double action of cauterizing and coagulating the diseased tissues, with a sterilizing effect upon the surrounding tissues. In dealing with a limited cancer the primary deposit should be removed by diathermy and the lymphatic glands by combined dissection and diathermy, the intervening tissues being treated by diathermy puncture. While this can be done at one sitting McKenzie thinks it is better to divide it into two separate operations. In ineradicable conditions bold and wide diathermy of tissue will prolong life, and the glands after diathermy puncture may shrivel and disappear.



A *B* *C* *D* *E* *F*

EPITHELIOMATA

Illustration A, epithelioma near ala of nose; B, after treatment by surgical diathermy. C, epithelioma of dorsum of hand; D, after treatment by surgical diathermy. E, epithelioma in axillary region; F, after treatment by surgical diathermy.

Treatment

Electro-coagulation by diathermy current, large indifferent electrode attached firmly to back, suitable needle electrode for active electrode. Local anesthetic, one-half of 1 per cent novocaine solution, to which is added 1-1000 adrenalin solution. Milliamperes, 700 to 1500 or more, depending on size of lesion, tissue resistance and machine used. Technique as on page 16. Indications, all epitheliomata. Contra-indications, none. After-treatment, sterile dressings, X-ray or radium therapy, actinotherapy.

[21] Brit. Jour. Radiol.



A



B



C



D



E



F

CANCER OF THE BLADDER

The above six illustrations show the various steps in this operation as performed by Gustav Kolischer, M.D., Michael Reese Hospital, Chicago. Detail of Dr. Kolischer's technique given below.

Treatment

Inert electrode, block tin, 20x10 cm., fastened under hips. Barnes bag inserted into rectum and distended by 200 c. c. of water, raising trigone and facilitating clearance of vesical base. Usual median abdominal incision exposing anterior aspect of bladder; reduplication of peritoneum stripped off by gauze dissection, exposing freely the outer anterior bladder wall. Then in the upper and lower angles of the wound two tension sutures are inserted which penetrate the bladder wall. The ends of the sutures are secured by metal clamps, whose weight helps to elevate the bladder, which in later stages makes the vesical cavity better accessible. Now the bladder is opened between these guy ropes by a transverse incision (illustration A). The transverse incision, while permitting free exposure of the vesical interior, offers the advantage of facilitating the suture of the bladder wound and at the same time prevents oozing of urine into the cavum retzii, in case the suture line should give. Then in the upper and

lower angle of the vesical incision a fiber retractor is inserted. If one encounters an arboraceous bushy tumor, an electrode carrying 3 or 4 spikes is chosen, and by raining a shower of heavy sparks all over the crown of the tumor (illustration B) a superficial coagulation or carbonization is accomplished. If the tumor is pedunculated, its seared top is seized with forceps and gently pulled upward. The exposed pedicle is now severed with a galvanocautery closely to its implantation (illustration C). The resulting stump and the immediately adjacent area are now coagulated with a stamp-shaped electrode (D). The sideration and coagulation are carried on until a thoroughly dry scab results and no punctuate oozing is to be seen. The bladder is now mopped clean and the incision in the bladder closed by catgut sutures inserted in such a way as to guarantee a broad apposition and avoidance of impaction of the mucosa into the suture line (E). Over this suture a simple running suture is whipped to insure water tightness. Then the tension sutures supporting the abdominal wall are placed. Underneath these sutures a fine drainage tube, preferably of silver, is placed, parallel to the incision and protruding at each end of it (F). Then fascia and cutis are closed in the usual way and the guy ropes are tied. The patient either begins to urinate naturally shortly after the operation or if unable to do so is catheterized at regular intervals until natural function is resumed. Beginning at the end of the first week after the operation as a matter of extreme precaution the bladder is regularly irrigated with an antiseptic solution.

CANCER OF THE MOUTH

William L. Clark, M.D., says,[22] "Electrothermic methods are peculiarly adapted to the treatment of cancer within the mouth. Malignant tissue (including bone) occurring in any part of the oral cavity, comprising the lips, buccal surface, tongue, floor of the mouth, alveolus hard palate, antrum, tonsils, pharynx, epiglottis, larynx, and proximal end of the oesophagus, may be destroyed with one electrothermic operation."

Wyeth expresses confidence[23] in surgical diathermy as a treatment for the removal of malignant lesions of the oral cavity, and his belief that better results will be achieved in the treatment of all neoplasms when surgical diathermy is employed in the beginning in all those cases to which it is applicable. His conclusions are based on the record made by the method over a period of five years, a record made on patients referred for treatment in many instances after surgery and physical measures had failed.

[22] J. A. M. A., 71, 17.
[23] J. A. M. A., July 10, '26.

CANCER, INOPERABLE—PALLIATIVE TREATMENT OF

Joseph K. Narat, M.D., Chicago, says,[24] "Surgical diathermy proved to be a very efficacious agency in the treatment of accessible inoperable neoplasms.

"The sealed blood and lymph channels guard against induction of metastases. Even in advanced, hopeless cases formation of metastases is undesirable because they may be source of great pain and impair the function of the involved organ and thus shorten the life of the patient. Surgical diathermy sterilizes the zone of potential invasion about the original site of the tumor and decreases the possibility of dissemination of malignant cells. The degree of destruction and the depth of penetration of the electrothermic energy can be regulated with great exactness. Haemostasis is secured easily, as the bleeding vessels are sealed with the electrode. No suturing is required."

For further discussions of various phases of Surgical Diathermy in cancer, see the following.

Steward, F. J.:—Diathermy in Treatment of Malignant Disease. Practitioner 108:328, May, 1922.

Kolischer, G.:—Surgical Diathermy and Radio-therapy in Cancer of Uterus. Surg. Gynec. Obstet. 35:227, Aug., 1922.

Patterson, N.:—Diathermy for Malignant Disease of Mouth, Pharynx and Nose with Notes on 17 Cases. British Med. Journal 2:56, July 14, 1923.

Wyeth, G. A.:—Endothermy in the Treatment of Accessible Neoplastic Disease. Annals of Surgery, 79:9, Jan., 1924.

Kowarschik. Josef (Berlin, Germany):—Surgical Diathermy. The American Journal of Physical Therapy, May, 1930.

Harmer, W. D.:—Diathermy for Cancer of Tongue. British Journal of Surgery 15:60.

Narat, Joseph K.:—Palliative Treatment of Inoperable Carcinoma. Archives of Physical Therapy, X-ray, Radium, Jan., 1928.

Bass, H. H.:—High Frequency Currents in the Treatment of Cancer. Archives of Physical Therapy, X-ray, Radium.

Kolischer, Gustav:—Diathermy in Cancer Therapy Archives of Physical Therapy, X-ray, Radium.

Schmidt, William H.:—Electrothermic Methods in the Treatment of Inoperable Cancer of the Breast. Archives of Physical Therapy, X-ray, Radium. Jan., 1928.

Ward, Grant E.:—The Present Status of Electrosurgery. Am. J. Surg., 6:2:232-3, Feb., 1929.

[24] Arch. Phys. Ther. X-Ray, Rad., Jan., '28.

CARBUNCLE

If the focus of infection is near the surface of the skin, electrodesiccation or even electrocoagulation is indicated.

CARDIAC DECOMPENSATION

A. F. Tyler, M.D., Omaha, Nebr., says,[25] "Treatment was given with diathermy through the liver daily. The medical regime was also continued. After the third treatment improvement was noted and after twenty-one treatments the edema had disappeared and the ascites had been absorbed. During the same time the liver decreased to its normal size and the heart became compensated. Within a month from the beginning of treatment the patient was able to be about the room."

CARDIAC DISEASE

Dr. Justina Wilson says,[26] "We know that, by Joules' law, whenever the diathermy current passes through the body, deep heat is produced by the resistance of the tissues. The effect of such deep heating means a better flooding of the tissues with arterial serum, better resorption of pathological products, relief of pain and increased circulation. Diathermy is extremely helpful in many cardiomuscular conditions."

Curran Pope, M.D., describes his treatment as follows:

Rest and exercise in alternation very valuable. Resistive exercises, walking and the use of the "stairs," enables accurate prescribing. Exercise improves the heart, if properly used. The ice bag, concussion of the spine, carbon dioxide baths or the author's method of using the apparatus of the whirlpool bath instead of CO_2 may be employed.

Diathermy is one of the very best of all the physical measures. I prefer large doses for shorter periods. Gradually work up to giving 1000 to 1500 milliamperes for 10 to 20 minutes. Heavy persons, those with large chest boxes, require more current and a larger period than thinner individuals with flatter chests. The anterior electrode should be smaller than the posterior. Diathermy is more active when combined with other physical measures and internal medication.

CARDIOSPASM, TREATMENT OF

Martha Brunner-Ornstein reports[27] that the unpleasant sensations experienced by the patient during the process of dilation immediately ceased with the passing of the diathermy current.

[25] Arch. Phys. Ther., X-Ray, Rad.
[26] Am. Jour. Phys. Ther., Dec., '28.
[27] Wiener Klinische Wochenschrift, Oct., '27.

The first treatment was given for ten minutes and the amount of current was 500 to 700 milliamperes, turned on gradually. The result was excellent and after three treatments the patient was entirely free from symptoms. All kinds and amounts of food, even solid food, could be taken. At increasing intervals six additional treatments were given. The author recommends this treatment, as it is painless and not dangerous, before resorting to surgical interference.

CATARACTS, SENILE

E. W. Cox, Everett, Wash., states that his treatment of senile cataracts consists of a large block-tin electrode placed on the back of the neck and extended down between the shoulders; a mesh electrode folded and fitted down over the eyes covering the eyes, eyebrows and most of the nose, the mesh applied damp and with wet towels covering it. The current is applied, starting at about 500 milliamperes and gradually increasing to the comfortable tolerance of the patient, which is found to average about 1000 milliamperes. Tolerance of the patient is always the guide. The length of treatments was from 30 to 50 minutes.

Treatments are given daily for the first month, then every other day and later once a week. Surging sinusoidal treatments are used to agreeable tolerance of the patient, after two weeks.

CATARRH, NASAL

Diathermy is a valuable aid in the treatment of this condition. For technic see Diathermy to Nose, pp. 90, 91. Treat five to fifteen minutes using a non-vacuum electrode with sufficient current to produce a sense of warmth to the inflamed mucous membrane.



Application of Electrodes

CELLULITIS

Diathermy is of value in this condition because it relieves pain, combats the infective agent, stimulates phagocytic activity, and hastens resolution. Preliminary to the treatment of cellulitis with diathermy one must make sure that suppuration has not taken place. If pus is present surgical drainage must be performed following which diathermy is of distinct value. If the

case is seen during the early inflammatory stage, most cases will respond readily to diathermy. This may be applied by means of the diathermy clamp or block tin electrodes, if the surfaces are such that they may be applied.

The dose should be fairly low milliamperage continued for a long period.

About 750 M. A. to each 15 sq. in. of electrode surface for 45 min. to an hour, once or twice daily till inflammation subsides. Careful watch should be kept for signs of suppuration and should this occur free drainage should be instituted before continuing the diathermy treatments.

CEREBRAL HYPEREMIA

Place large block-tin electrode over abdomen and have the patient lie on the autocondensation pad. Treat for twenty or thirty minutes at 600 milliamperes. This stimulates the vaso-dilator fibres and produces a congestion in the splanchnic area, automatically depleting the cerebrum. This treatment is very effective.

CERVICITIS, UTERI

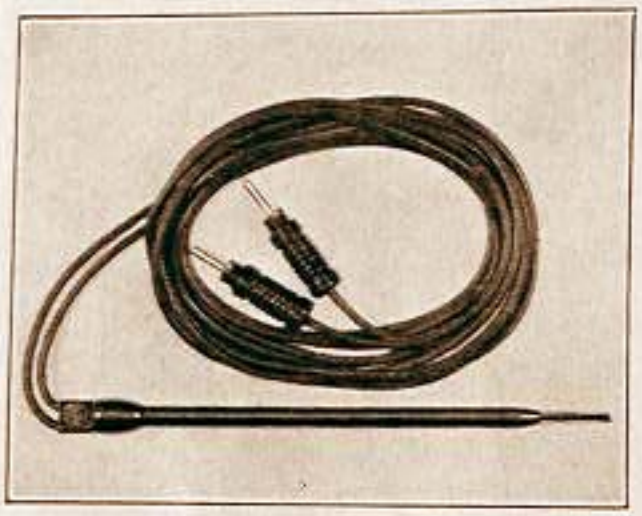
Also, see section on Diathermy in Gynecology, pp. 70 to 74.

The method commonly employed before the advent of the new device which we will describe in the following, was to place a large indifferent electrode on the abdomen and a small active electrode or rod, in the cervical canal. However, by this process the diathermy current travelled through a variable amount of tissue, including skin, fascia, muscle and intestinal wall, and the resistance of these tissues decreased the efficiency of the action of the current at the cervix. It was indeed difficult by this method to determine the amount of current required in the extent of destruction of tissues.

Accordingly an electrode has been designed (the Modified Cherry Cervical Electrode) in which both electrodes are made active, and so small that they can lie side by side in the cervical canal in contact with the mucous membrane from the internal to the external os. The current in passing from one of the small electrodes to the other traverses about ⅛ of an inch of tissue. The electrode consists of a handle with a small tip of insulating material, along each side of which tip and separated by ⅛ of an inch, are two parallel metal plates which come in contact with the endocervix along the side of the canal.

This bipolar instrument makes possible the predetermination of the extent of destruction which is to be accomplished. It is possible to ascertain in advance of the treatment that a certain milliampere reading (via short circuit method) on a certain machine will in a certain number of seconds produce the desired coagulation within the endocervical canal. This makes the application an exact science.

Another point in favor of this procedure is its extreme simplicity. Any clinician can safely do expert work in his office without fear of complication. This technique requires far less knowledge and experience than is required when utilizing cautery, curette or electro-surgical tissue-cutting operations. It is a painless procedure, no anaesthesia being required in the average case, and at the same time it is ambulant. The patient does not sacrifice occupational time, nor is she subjected to subsequent menstrual disturbance or pain.



Cherry Cervical Electrode

Since this method enables the removal of the endocervical glands with the least destruction of uninvolved muscular tissue—less than any method now available—there is naturally less chance of stenosis and functional impairment of the cervix.

The absence of hemorrhage by this method is noteworthy.

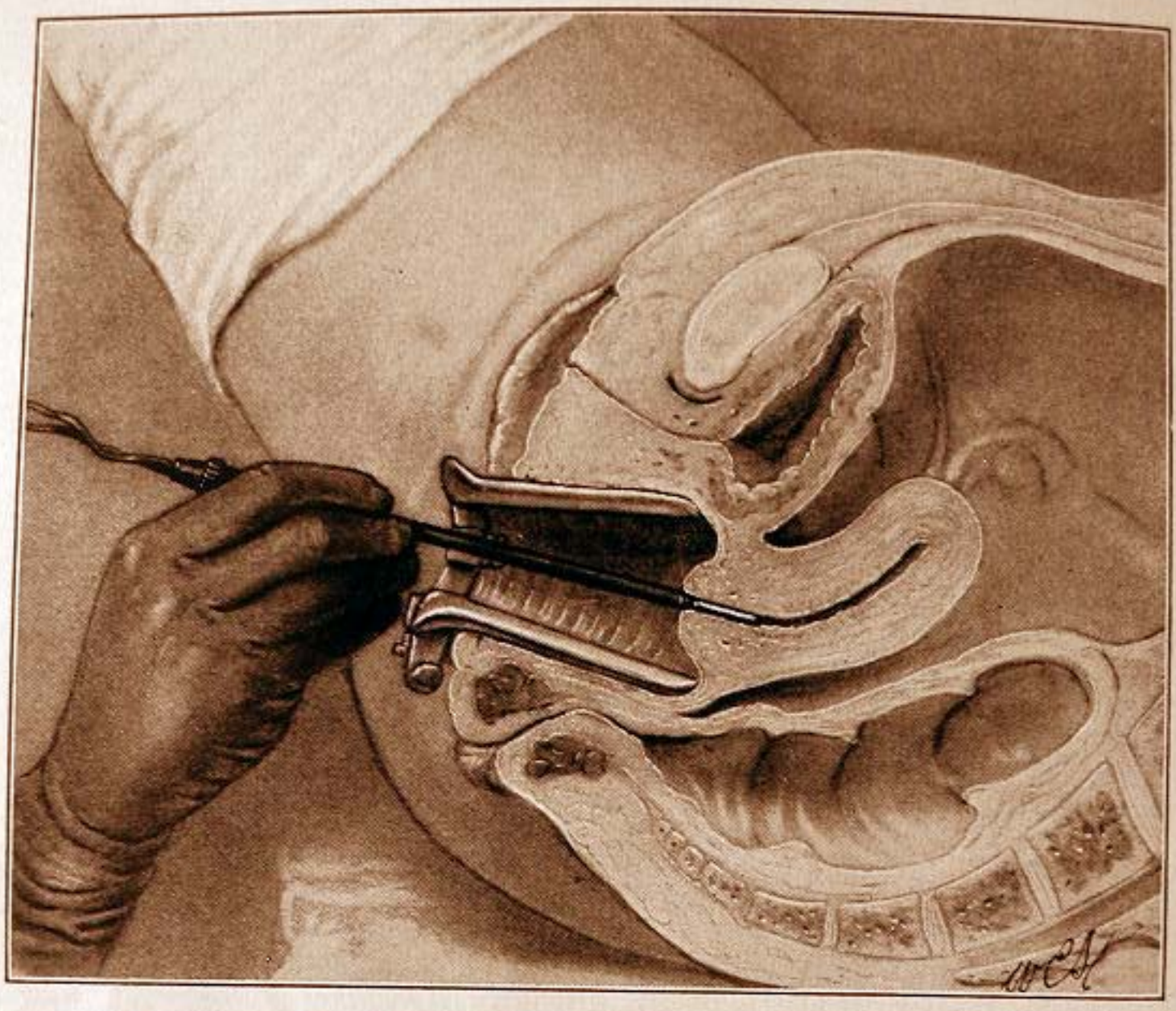
A number of gynecologists have challenged the statement that an erosion covering that area of the cervix outside of the external os would clear up as a result of the coagulation of the endocervical glands without further treatment. Several hundreds of cases have been treated and the fact definitely proven that in the majority of cases at least, the erosion does resultantly clear up. In a series of over one hundred carefully supervised cases at a Clinic at the Harlem Hospital, New York, it was shown quite clearly that this erosion did automatically clear up when the endocervical glands were coagulated between the external and internal os—this level apparently being the contributing factor to erosion externally. In this connection proliferation of epithelium takes place within the length of the cervical canal, expands outward gradually and replaces the eroded area to the end that inspection six weeks later reveals what appears to be a condition comparable to the normal cervix.

It appears then that fundamentally it is entirely unnecessary to treat the eroded area of the cervix. There are occasions, however, when a certain additional area should be coagulated, and this can be done with the Cherry Electrode in the following manner. After the cervical canal has been coagulated, the speculum is partly collapsed which in turn allows the partial eversion of the superior and inferior lips of the cervix over the electrode, which electrode has been left in the cervical canal in its original position. Repeating then the coagulating procedure in this position coagulates a large section of the eroded area around the external os.

Existent cysts are punctured with the monopolar current utilizing a sharp needle, or may be coagulated with the bipolar current.

Forty cases of extensively eroded cervices were selected at Harlem Hospital Clinic. In half that number coagulation of the cervical canal between the interior and exterior os was done with the Cherry Electrode disregarding the erosion entirely. The same procedure was followed in the second group, and in ten cases bipolar superficial diathermy was utilized for the purpose of coagulating the entire cervical erosion. In the remaining ten cases the eroded area was subjected to the point of superficial dehydration with the monopolar current. For all practical purposes the ultimate healing time and the replacement of epithelium over the eroded area was the same in all cases whether the erosion was treated or not.

Another point in connection with this procedure is that the type of infection and the degree of virulency of that infection of the cervical canal seems to be entirely irrelevant as far as this treatment is concerned; in other words, there seems to be no contra-indication, and about the only other suggestion connected with the technique other than the collapsing of the speculum and the proper rotation time of the electrode, plus of course the proper amount of milliamperage, is that the operator should endeavor to recognize the "feel" of the internal os and be able to retract the active point of his electrode 1 mm. or two back from this muscle before actually turning on the current. Even this, however, is not important since the only resultant damage of getting in close proximation or even through the internal os is a slight discomfiture as would be manifested by referred pain on the part of the patient.



Cross Section of Uterus Showing Position for Patient, Cherry Electrode Introduced into Cervical Canal

No anaesthesia is employed for this work, though occasionally a patient, probably one of the neurotic type, complains a trifle. This is not important since the entire treatment is of short duration.

It is occasionally necessary to recoagulate the cervical canal after a period of four or five weeks, because the coagulated area has not been carried to sufficient depth at the original treatment. In most cases, however, one application will be found sufficient to clear up the cervical canal as well as existent erosion, eversion and the various types of discharge about which the patient complained.

Dependent upon the extent of the involvement, an area of 2 to 4 mm. of coagulation should appear around the external os after the treatment.

For the best end results it is apparent that relatively slow, even coagulation such as would leave the coagulated area entirely soft, would be most desirable. For example, on the Fischer "G2" Machine a short circuit milliamperage between the medium voltage and indifferent outlets using an ordinary six-foot dia-

thermy cord to create this short, is about 2,200 M.A. This causes a very even coagulation throughout the entire length of the cervical canal to a depth of 3 to 4 mm. in the average cervix in from 6 to 8 seconds. Sometimes, however, longer time is required as for example where the cervical canal is quite large and electrical contact not good.

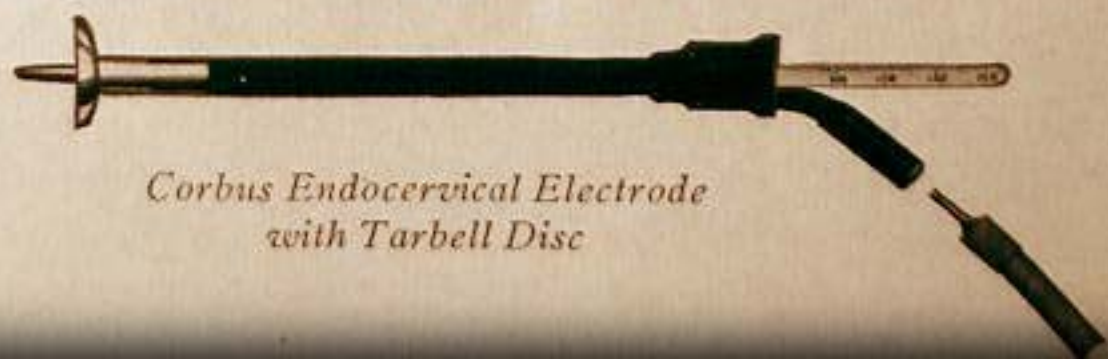
The physician can readily observe the results of the treatment by the depth of coagulation; a cross section at the external os reveals this.

Accordingly a second treatment will occasionally be required of a few additional seconds.

The illustration shows the position of patient, speculum and electrode for coagulation of the cervical canal. The stem of the electrode is held between the thumb and index finger, and revolved back and forth at the rate of about one complete movement each second, until proper coagulation is accomplished. When it is desired to coagulate a cervical erosion of the external os, collapse the speculum a trifle so as to evert the cervical lips and retract the instrument about half way. The instrument is then rotated between the thumb and forefinger the same as in the foregoing, and at the same time describe an arc with the handle (to the limit permitted by the speculum) over the area which is to be further treated. The diathermy current should never be turned on until the instrument is in proper position, and should always be turned off before removing. No after treatment is necessary except that patients are instructed to take a saline douche twice daily. Patients are likewise advised to expect a rather extensive increase in discharge for a week or so following treatment.

CERVIX, STENOSIS OF

Use special Corbus or other type of small endocervical electrode. Elevate temperature until sufficient tissue destruction is produced to ensure a normal sized cervical opening. After the process has healed, sounds should be used occasionally in order to prevent cicatricial formation and a recurrence of the stenosis.



Corbus Endocervical Electrode with Tarbell Disc

CHANCROID

Chancroid is best treated by desiccation. The sore should be carefully cleansed, a local anesthetic applied, and time allowed for the parts to become thoroughly anesthetized. Apply direct spark until all of the Chancroid has been thoroughly charred. The after-treatment consists in absolute cleanliness of the part, though patients are grateful where soothing ointments are applied.

CHOLECYSTITIS

Diathermy, while of value in the treatment of an inflammation of the gall bladder as in other inflammatory conditions, compels the physician to bear in mind the danger of rapidly breaking-down a purulent gall bladder and producing a general peritonitis in a portion of the abdomen where as a rule it is rapidly fatal. Electrodes should be 5x7″ in size or slightly larger. Place one over the gall bladder and the other on back just opposite. Diathermy up to 1,000 M.A. should be employed for 20 to 30 minutes. Never pass the point of comfortable toleration. Treatment of gall bladder disease by physiotherapy as well as medication, requires time and patience; results appear, not in a week, but in several months.

CHOLESTEREMIA

The use of diathermy for conditions in which the blood cholesterol is obviously altered by other than purely mechanical means (such as chronic nephritis) is postulated on the basis that, apparently, treatment with diathermy lowers blood cholesterol.

The contra-indications to the use of diathermy are those conditions associated with a marked hypocholesteremia.

Physiologically, the lowering of blood cholesterol by diathermy seems to offer new therapeutic indications.

These conclusions were reached from studies by Dr. Kobak on a number of patients with a variety of surgical and other conditions, selected at random from the Cook County Hospital and from the Rush Medical Central Free Dispensary. In general, blood was obtained from the arm in the usual manner; diathermy was applied over the region of the liver and gall bladder; and a second specimen of blood was again collected following the treatment. A d'Arsonval type of current was used. There was nothing unusual in the manner of application, it being essentially that recommended for the treatment of this region by competent workers. With the apparatus used, the milliam-

peres registered about 1200, the current density was between 60 and 70 milliamperes for each square inch of active electrode surface, and the treatment lasted one-half hour. The blood cholesterol was determined by an established method of known accuracy, for which method it is claimed that the normal range of cholesterol is between 140 and 160 milligrams per 100 cubic centimeters of blood. The results revealed a lowering of the blood cholesterol in each of the 21 cases studied.

CIRCULATORY DISTURBANCES

Dr. T. F. Cotton, at a meeting of the Section of Electrotherapeutics of the Royal Society of Medicine, dealt with the results of diathermy in disturbances of the cardiovascular system. The value of the treatment, he said, depended entirely upon the production of heat within the body; there was general agreement that no other special effect came into play. Lewis had lately advanced the view that the reaction of dilatation of the arterioles, venules, and capillaries to changes of temperature was dual; there was a direct influence of heat evidenced in a lessening of tone of the walls of the small blood vessels, and also an indirect (and predominating) influence of heat in increasing the concentration of vaso-dilator substances in the tissue spaces. This reactive hyperaemia, with increased blood flow, was the mechanism of fine adjustment which governed the nutrition of the tissues. It was probable that the deeper vessels reacted in a manner similar to that of the cutaneous vessels, and, this being the case, diathermy in the treatment of disturbances of the cardiovascular system had a direct relation to the physiological facts.

It followed from this explanation of the mechanism of response of the blood vessels to heat that when constrictor influences predominated and caused alteration in the peripheral circulation, with eventual pathological changes, the release of these vaso-dilator substances, causing the small vessels to dilate, brought about the restoration of the normal circulation and blood supply to the tissues. Diathermy, therefore, seemed to have an appropriate part to play in the treatment of such conditions.

CONJUNCTIVITIS

Vacuum or non-vacuum eye electrodes may be used, but a special metal electrode as used with the diathermy headband serves best. Treat five to ten minutes using low milliamperage. For application of electrodes see page 63.

COCCYGODYNIA

If this is produced by an injury to the bone or inflammation, diathermy will prove useful in its treatment. Patients in whom no pathological condition is apparent and the pain is only a symptom of a neurotic affection, may be benefited from a psychological effect. Apply one electrode over painful area and another —much larger—electrode over the lower abdomen. Treat twenty minutes at 1500 milliamperes.

COLIC, GALLSTONE

See pp. 65 and 66.

CORYZA, ACUTE

Dr. Tsinonkas says[28] that he was led to apply diathermy in the treatment of coryza by observing the good effects of steam inhalations on patients suffering from this disease.

Cylindrical electrodes are used. The electrodes are placed on the soft parts of the exterior of each side of the nose. The patient, himself holding each electrode, is placed comfortably in a chair. After ten minutes, the current having reached an intensity variable with the patient, 500 M.A. on an average, the patient is told to raise the electrodes gently along his nose without changing his position. The nostrils are cleared and the patient is asked to breathe. Usually the patient already acknowledges an improvement.

The treatment lasts 20 to 25 minutes. A single treatment is sufficient, if there do not exist any chronic changes of the nasal fossae, polypsi or hypertrophy of the turbinated bones, etc. After the treatment the respiratory difficulty disappears and sneezing ceases, mucous secretion is drained and the patient confesses to a remarkable well being. Patients with a stronger attack of acute coryza can bear a more intense current than patients with a lighter attack.

Also, see Diathermy to the Nose, pp. 90, 91.

CYSTITIS, ACUTE

Place electrode over lower abdomen, with larger indifferent electrode underneath sacrum. Raise milliamperage to patient's skin tolerance and treat thirty minutes to one hour daily. Some advantage is gained by having the bladder distended during treatment. The patient voids immediately after the treatment, thereby washing out the inflamed bladder.

See discussion of Chapman's Electrode under "Gynecology."

[28] Arch. D'Elec. Med., No. 525, '27.

CYSTITIS, CHRONIC

The treatment of chronic cystitis does not differ from that of the acute, except that the treatments need not be so prolonged and may be given only three times weekly. It is often necessary to wash out the bladder after treatment with a warm boric acid solution as many of these patients have retention of urine.

See discussion of Chapman's Electrode under "Gynecology."

DUODENAL ULCER

Diathermy is used in duodenal ulcer to relieve the pain, and to promote healing. Treat thirty minutes daily elevating the milliamperage to the patient's skin tolerance. If the patient experiences vertigo or malaise during or after treatment, (over stimulation of the solar plexus with splanchnic congestion), lower the amperage. Apply 5x6 in. electrodes over the source of the pain and underneath the shoulders or spine. Quartz light treatment is a valuable adjunct.

DYSMENORRHEA

Cumberbatch and Robinson in England report that they have treated with diathermy congestive dysmenorrhea, climacteric flooding, and arthritis secondary to a chronic endocervicitis. They found the swelling, pain and disability of the arthritic joints to subside rapidly following several applications of diathermy to the infected cervix.

Thomas B. Sellers, M.D., New Orleans says,[29] "It is no longer a debatable question as to the value of diathermy in chronic pelvic infections. It not only assists in relieving symptoms but frequently obviates surgical interference."

DYSPEPSIA

The observations of Klyachkin and Mogilevskiy[30] were made on forty-two patients with various dyspeptic disturbances. In cases of organic achylia, the treatment had no influence on the gastric secretion; but it induced improvement of the general condition and caused the disappearance of subjective signs which had previously resisted various remedies and diets. Therefore, diathermy was recommended for patients with dyspeptic manifestations, regardless of the condition of the gastric acidity.

EARACHE

For intractable otalgia, diathermy should be used over the mastoid region for 30 minutes, followed by negative galvanism

[29] Paper, 8th Ann. Cong. Phys. Ther., Nov., '29.
[30] Kazansky Med. Sur., 26:963.

for 5 minutes. Repeat in 12 to 24 hours as indicated. Make sure that there is no pus under pressure behind the tympanum.

EAR, DIATHERMY TO



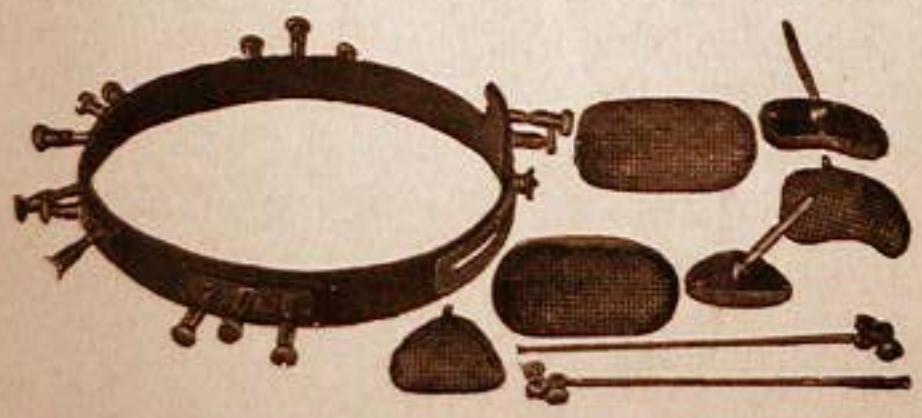
Application of Indifferent Electrode

A. R. Hollender, M.D., Chicago, Illinois,[32] summarizes and concludes an article entitled "Rational Uses of Physical Energies in Oto-Rhino-Laryngology," by saying, "Middle-ear deafness is an indication for medical diathermy, especially after the usual methods have failed to bring about improvement."

Diathermy introduced by way of the ear canals does not reach the middle and inner ears with adequate intensity. The active electrode is placed in contact with the mastoid area of the ear being treated, while the indifferent electrode is placed on the opposite side, anterior to the ear. One ear is treated at a time. The point of greatest heat with the above technic is at the petrous portion of the temporal bone. Three to four treatments weekly are given with a milliamperage of 250 to 400. The time of each treatment is 20 minutes, after which negative galvanism is applied for 5 minutes. The number of treatments is determined only by the requirements of each individual case. This method is now being extensively employed for all types of otitis media.



Application of Active Electrode to ear by means of headband



Showing Headband and Special Electrodes for use in Diathermy Treatment of Eye and Ear

Dr. Dan McKenzie, of Glasgow, Scotland, says[33] that in the presence of pus or in cases with very definite otosclerosis, diathermy is contra indicated. Diathermy promises the best results in "dry deafness."

[32] Am. Jour. Surg., Feb., '30.
[33] Eye, Ear, Nose & Throat, Mo., June, 28.



ELECTRODE, NON-VACUUM

At Left—Use of non-vacuum electrode, with monopolar current, in treatment of facial and glandular conditions. ⅛ to ¼ in. spark, treatment for 10 to 15 minutes.

At Right—To avoid unpleasant sparking when making contact, connect tube to unipolar outlet of machine, regulate spark, then place your fingers on electrode until it is in contact with patient (See illustration in oval.) Fingers are then removed and electrode is moved over area to be treated.



ELBOW, DIATHERMY TO

Application of electrodes by means of Diathermy Clamp. A satisfactory and effective method. Milliamperes, 800 to 1200, patient's tolerance.

Showing Electrodes held in place by Diathermy Clamp

ENDOCERVICITIS

See Cervicitis Uteri, pages 51 to 55.

ENDOMETRITIS

See section on Diathermy in Gynecology, pp. 70 to 74.

EPIDIDYMITIS

Apply Corbus epididymis electrode and treat daily or twice daily—twenty minute periods—until condition is relieved. Never exceed patient's comfortable tolerance.

ENDARTERITIS OBLITERANS

Charles E. Stewart, M.D., says[34] that the agonizing pain which is so frequently present in endarteritis obliterans is often favorably modified and sometimes entirely disappears for a time at least by the application of diathermy to the legs.

[34] Am. Jour. Phys. Ther., Jan. '27.



Application of Active Electrode to eye by means of headband

EYE, DIATHERMY TO

Diathermy to the eye is best applied directly by means of a metal electrode. The most convenient method is to apply the headband and special eyepiece. Various eye affections are now being treated in this way.



Application of Indifferent Electrode

Dr. Merimanoff says[35] that diathermy is a valuable adjuvant in the treatment of blepharitis, conjunctivitis (especially gonorrheal), corneal ulceration, inflammatory conditions of the sclera, retrobulbar and orbital tumors, and after enucleation, before adjusting the artificial eye.

FRACTURES (After-Treatment)

Diathermy applied in these conditions will stimulate nutrition and promote rapid healing, convalescent time may be shortened from one-third to one-half, and many deformities obviated.

If it can be arranged, a diathermy treatment should be applied to the fracture before the immobilization dressing is put on. This will contribute largely toward preventing swelling and eliminating pain; it will promote callus formation.

Never enclose electrode plates in a cast with a view to applying diathermy to the limb within the cast. Instead, remove the cast or immobilizing dressing daily and apply the diathermy treatment. If this is not possible, windows may be left, through which the treatment may be applied. Otherwise, allow sufficient time for a callus to form that is strong enough to hold the ends of the bone in position, which is ten days to two weeks; and then begin applying diathermy, continuing the immobilization.

Diathermy is also useful in building up the nutrition of muscles that have remained in a cast for many weeks; to this should be added massage, and stimulation by sharp sparks from the glass-vacuum electrode.

Proper use of the electrical modalities in fracture of the elbow will avoid the permanent disabilities which sometimes follow injuries of this nature.

Various methods of treatment shown on the following page.

[35] Rev. Gen. D'Opthalmol., No. 3, '27.



FRACTURED ELBOW

Applying Electrodes

At Left—Electrodes applied laterally.

At Right — Method of bandaging electrodes in place with elastic bandage.

FISSURE IN ANO

Dilate the sphincter under an anesthetic. Treat by direct fulguration or use cautery. Dress with oily antiseptic dressing. Healing is usually complete in one week.

FISTULA IN ANO

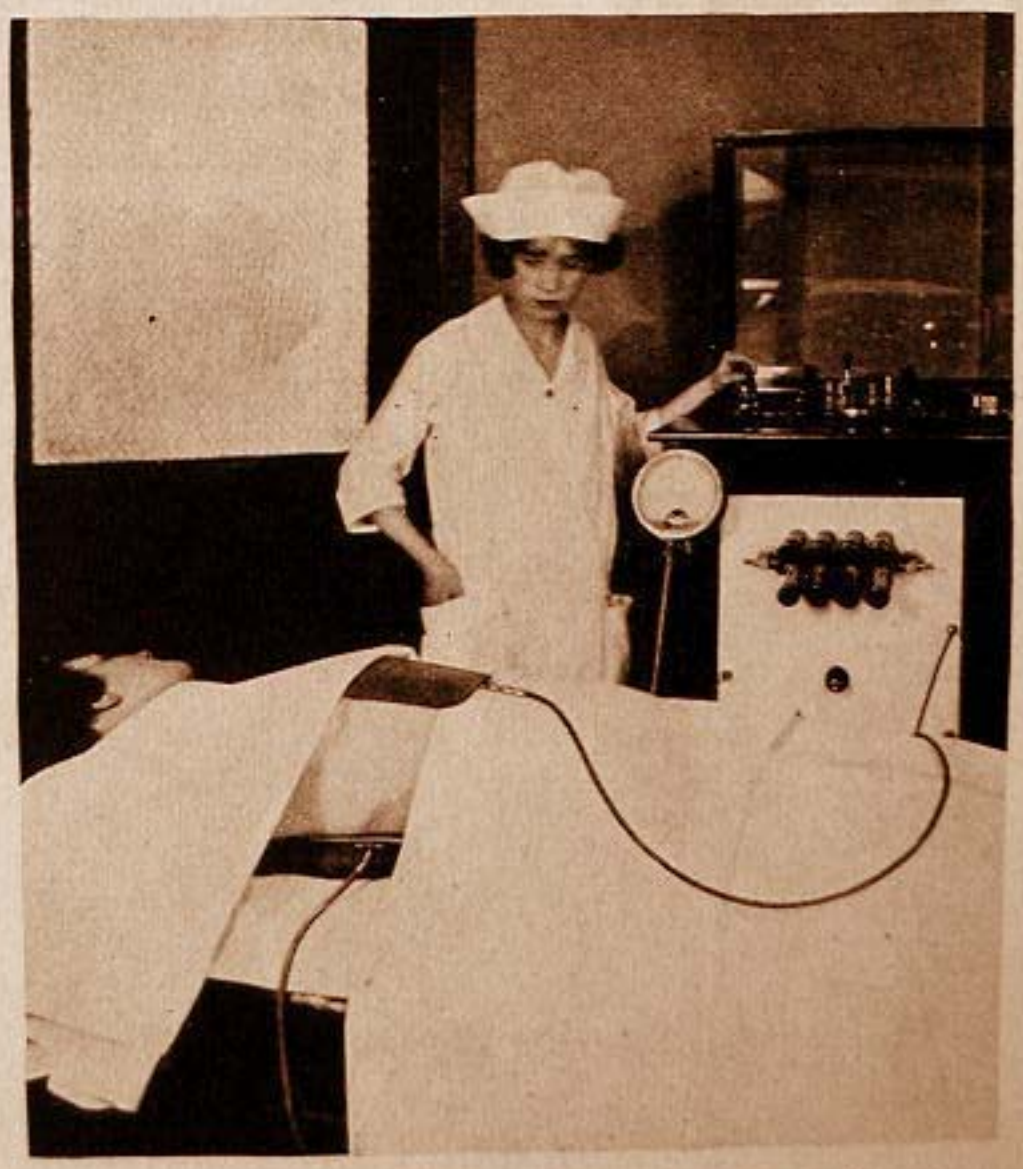
If the fistulous tract is long and tortuous, surgery is the only recourse. If it is possible to insert an aluminum probe throughout the length of the tract, this can be used as the active electrode, and the walls of the tract electrocoagulated. If the coagulation takes in all of the diseased tissue, healing by granulation will take place. Keep the tract drained by irrigation. If the coagulation was not thorough enough the first time, the procedure can be repeated in ten days or two weeks.

GALLSTONE COLIC

Miles J. Breuer, M.D., Lincoln, Nebr., says that diathermy, applied from front to back through the gall bladder region, continued for a sufficiently long period of time, increases local nutrition, relieves the inflammation, relaxes spasm, promotes elimination.

We assume that by gallstone colic is meant the pain produced by the passage of biliary calculi through the cystic, hepatic or common bile ducts.

When the stone starts down the duct, the irritation produced immediately sets up a spasm which persists until the smooth muscle



Diathermy Treatment of Gall Stone Colic



Application of Electrodes in Gall Stone Colic

fibres of the duct are tired to the point of relaxation. The acute pain then somewhat subsides, only to recur on subsequent irritation. This accounts for the paroxysmal character of the pain of gallstone colic.

Diathermy is of distinct value and should be employed during an attack of gallstone colic, as it favors a relaxation of the duct and permits the stone to pass into the duodenum.

A tin plate electrode 6 x 8 inches is applied under the seat of pain in the dorsal region, another 4 inches square is placed anteriorly so as to include the painful area. It is held in place by sandbag. Use 1000 to 1500 M.A.

GANGRENE

In the predisposing stages, before tissue death has taken place, especially in the cases of endarteritis obliterans, a great deal can be accomplished by diathermy toward preventing the supervention of gangrene.

GONORRHEA

Heat is a specific for all gonococcal infections; the only problem that confronts the physician is the effective application of diathermy to the infected area. This problem has been solved in the female; refer to the section on Diathermy in Gynecology, pages 70 to 74. In the male, however, this problem assumes greater proportions. No procedure that will apply in all cases has been perfected as yet, but the following methods have met with more or less success in the hands of their originators.

Wolbarst says,[36] "Diathermy is the most useful of recently introduced methods of treatment; it is practically a specific. The pain is almost immediately controlled and the incapacitation is reduced from weeks to days."

Rowell uses an electrode consisting of two parts—a bakelite frame with two adjustable pieces of metal, curved to fit the outside of the penis, and a straight, nickel-plated, perforated electrode to be inserted into the urethra. The latter is attached to one pole of the diathermy current and the external electrodes are connected to the other pole by means of a multiple connector and a double cord. A special thermometer in the urethral electrode makes it possible to keep a constant check on the temperature.

The thermal death point of the gonococcus is given as 104° F. for a period of 6 to 8 hours, or 108° F. for 30 to 40 minutes. It is therefore reasonably safe to assume that a temperature of 109° F. to 110° F. will destroy the organism in living tissue in 30 or 40 minutes, and this degree of heat can be very easily obtained without any discomfort to the patient. In fact it is possible to apply a uniform heat of 112° F. to 114° F. to the male urethra from the cut-off muscle to the meatus. Rowell has had better results, however, with a temperature of 109° for 30 minutes than with the higher temperatures. It is also possible to apply a solution of mercurochrome, acriflavine or any other drug desired to the urethra during the diathermy treatment.

One objection to this treatment is that it necessitates instrumentation of the urethra, and therefore is contra-indicated in acute cases. However, the urethral electrode can be made as small as No. 16 French, and it is Rowell's opinion that the good obtained by the treatment will more than offset any harm that may be done by the insertion of so small an instrument.

Eugene B. Perry, M.D., Chicago, says,[37] "The diathermy treatment consisted of snugly enclosing the penis with the whole pendulous and scrotal urethra between the ventral and dorsal

[36] Am. Jour. Surg., IV, 3.
[37] Arch. Phys. Ther., X-Ray, Rad., Feb., '28.

electrodes after lubricating these plates with the prepared soap. The indifferent pole attached to the dorsal post and the active pole to the ventral post. Then the patient is cautioned to keep his hands behind his head and the current turned on and gradually stepped up at five-minute intervals to the point of toleration. On several occasions I have reached 750 milliamperes without serious complaint. By occasionally inserting a bare thermometer a short distance in the urethra an accurate idea of the temperature developed may be thus obtained. This latter procedure is only infrequently resorted to and is only occasionally necessary. My temperature range, I discovered to be between 110° and 114° Fahrenheit, without discomfort to the patients.

"The length of each treatment depended upon the temperature I was able to develop and varied between 30 to 60 minutes. The patient is then allowed to urinate and an injection of 5 per cent argyrol given. One must remain in constant attendance during the treatment as the penis changes in size frequently, thus diminishing the area in contact with the electrodes, requiring readjustment after momentarily turning off the current.

"These treatments are given daily or every other day, depending on their individual length, the temperatures developed and the patient's tolerance. Should the patient have a very profuse discharge it seems advisable to diminish the length of the treatments and give them more frequently in order to prevent the damming back of purulent material into the posterior urethra."

William Bierman, M.D., New York City, says[28] that there are several ways of applying the high frequency current to the penile urethra. The penis may be plastered down against the anterior abdominal wall as the patient lies on his back. A copious quantity of soap suds is placed between the penis and the abdomen, so that for electrical purposes that organ becomes an integral part of the anterior abdominal wall. A narrow strip of composition metal is placed over the penis and connected to one pole of the diathermy machine. This metal strip should extend from the meatus to and slightly beyond the penoscrotal junction. If it is prolonged too far down on the perineum, most of the current will pass from this portion to the other metal electrode used to complete the circuit and which is placed under the lower back and buttocks. This latter electrode may be of about eight by ten inches. The penile electrode should not be bent around the sides of the penis. This would cause the current to pass mainly from the edges of the electrode, particularly if it touched the abdom-

[28] Phys. Therapeutics, Jan., '28.

inal wall. The major heating effect would then be lost where it was most desired—in the urethra. This method is of great value in the treatment of preputial edema. All metal electrodes should be well moistened with soap suds when applied.

Roucayrol uses a special urethal electrode which is inserted inside the penis with an indifferent electrode over the abdomen. This special electrode carries a thermometer and Roucayrol treats for twenty minutes daily with the thermometer registering 45° Centigrade. He claims excellent results.

Corbus & O'Conor also use the special endo-urethal electrode and recommend temperatures of 108° F. and even higher for thirty minutes. Indifferent electrode over abdomen or sacrum.

For the active electrode Chapman uses silver mesh, cut in such a way that it can be wrapped around the anterior third of the penis. Antiseptic soap is applied freely to insure a good contact during the treatment. To prevent short-circuiting the current through some other part of the body (the thigh if the patient is treated in a sitting position, or the abdomen if he is lying down) the penis is placed in a small saucer, either on the legs or abdomen. A large piece of block tin on the patient's back serves as the indifferent electrode. Treatments are given for 60 minutes daily at the patient's point of tolerance.

Another method that has met with some success is to suspend the penis in a small jar containing salt solution which acts as the active electrode. In this treatment care must be exercised to prevent burns as the glans penis is almost devoid of heat fibres and unless a considerable portion of the penis is immersed in the solution, scalding may result.

The Cumberbatch method of applying the diathermy follows: A ribbon of lint, 1 inch wide, soaked in saline, is wrapped around the free end of the penis, and around the lint is placed a metal band. This is connected to the diathermy machine. An indifferent electrode is placed above the pubes. The current is gradually increased, and the penis is kept as hot as can be borne without discomfort, for 10 minutes.

In treating gonococcal urethritis, the indifferent electrode might be replaced by a second active electrode placed on the perineum. The prostate and the prostatic part of the urethra might be treated by a slightly concave metal electrode, shaped like a shallow spoon, mounted on an insulated handle, and placed in the rectum and pressed against the prostate.

GYNECOLOGY, DIATHERMY IN

R. Alamanni says[39] that he has investigated the physical-biological healing properties of diathermy in a large number of cases. In inflammation of the adnexa he found cures in 77.98 per cent of the cases, improvement in 20.8 per cent, and made worse in 1.8 per cent. He observed the same results in pain in the lumbo-sacral region. Good results were noted in retroversio uteri, where the therapy gradually led to a mobilization of the organ. Whereas there occurred no noteworthy improvement in amenorrhea, the success in dysmenorrhea was remarkably good.

Diathermy, when used in the treatment of inflammatory diseases of the female pelvis, has the following general effects:

1. It alleviates pain. 2. It has a localized action. 3. It increases the blood supply to the part. 4. It leaves no bad after-effects. 5. Bacteria are either killed or attenuated in virulence according to their ability to resist high temperatures. The gonococcus is attenuated in virulence and prevented from reproduction by a temperature of approximately 104° F.

On account of its analgesic action, diathermy is indicated in painful menstruation. On account of its vaso-motor effects, it is indicated in amenorrhoea. Its greatest value, however, lies in the treatment of inflammations in which it has a specific action upon the infective agent as well as in producing the general beneficial effects already mentioned. The technic in all of these conditions is approximately the same. Any variation from the routine treatment is given underneath specific title of disease.

From what has already been said, it is apparent that, in the treatment of gynecological conditions by diathermy, we are more concerned with the location of the disease than with its specific cause. We are aware, however, that pathogenic bacteria behave differently when exposed to heat, and will mention the resisting power in vitro of a number of the micro-organisms that are found most frequently in pelvic infections.

Streptococci—110-125° F., in from 10 to 20 minutes.

Staphylococci—140° F. in approximately 30 minutes.

Tubercle bacilli—140° F. in approximately 20 minutes.

Gonococci—140° F. in approximately 30 minutes.

You will note that the thermic resistance of the gonococcus in vitro is as high as that of any of the other pathogenic micro-organisms. This is significant as it has been found that in vivo

[39] L'Actinother., 6, 2, '27.

the gonococcus is prevented from reproduction by temperatures in excess of 104° F., and Corbus & O'Conor claim that 108° F. destroys the micro-organism in 30 minutes. Ehrich states that the time is much less, but the importance of these factors is merely to determine the duration of the treatment, and it would appear that where it is possible to elevate the temperature of the tissues to 108° F., 30 minutes time is sufficient to destroy all common types of pathogenic bacteria.

E. P. Cumberbatch, M.D., London, England, treats urethra first, whether infected or not, as a guide of strength of current to be used in the insensitive cervix. The urethral electrode is a thin-walled metal tube about 3/16 inch in diameter, the end of which is rounded and closed. A thermometer is inserted into applicator so that accurate readings may be observed. The circuit is completed by a belt electrode 3½ inches wide and long enough to pass around the pelvis, with free ends overlapping. The contact side of this belt electrode is coated with soap lather before applying. Secure ends of belt with adhesive tape.

Treatment is started with a very weak current, and the milliamperage is increased gradually. The patient will become aware of the heat and finally will advise of discomfort; then reduce to a point where pain is no longer felt, and thermometer reading will usually indicate between 113° and 115° F. Treatment should last 10 minutes.

Remove applicator and pass speculum into vagina. The cervical electrode is a flexible metal rod made of block tin about 3/16 inch in diameter. At a point ¾ inch from the smooth rounded end, this electrode is bent at an obtuse angle. A flexible rubber tubing is passed over the rod.

Insert the bent end into the canal of the cervix, and then slip down the rubber covering until it comes in contact with the cervix. Start treatment with little current, and gradually increase the milliamperage until approximately one-half the current is being employed as when treating the urethra. Continue treatment for at least 10 minutes. It is not necessary to use the thermometer for this treatment. If electrode employed is less than 3/16 inch diameter, reduce milliamperage in proportion. Treat bi-weekly.

Joseph E. G. Waddington, M.D., of Detroit, says:[40] "The Cumberbatch-Robinson treatment of gonorrheal arthritis, with diathermy directed intensively to the involved genitourinary organs, should be instituted whenever such infection may be even remotely considered etiological."

Treatment with the Chapman Vaginal Electrode

This instrument is furnished in two sizes, and comes either with or without the thermometer attachment. For accurate work, however, the thermometer is absolutely essential.



Fig. 1. Chapman Vaginal Electrode with Thermometer

Application of Electrodes

In the treatment of buboes, perineal abscesses, ulcers, vulvitis, anterior vaginitis, anterior urethritis, etc., a mesh sponge applied directly to the infected area with a larger indifferent electrode over the abdomen or the sacrum is indicated. In the treatment of disease of the internal female organs, however, the special Chapman Vaginal Electrode should be used.

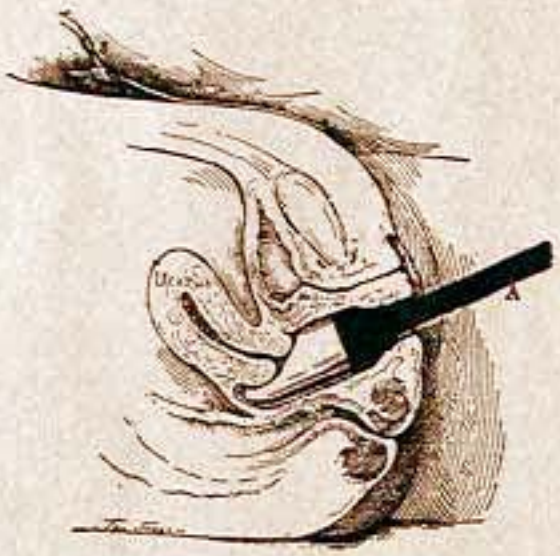


Fig. 2—Insertion of Chapman Electrode

This instrument is introduced edgeways into the vagina and, after insertion, is rotated into position (Fig. 2). When properly applied it automatically engages the cervix within the cervical bowl and elevates and supports the uterus, while the vulva closes over the insulated vulval groove and helps to hold it in position. These factors are of practical importance as all other types of vaginal electrodes will work out of the vagina during treatment. The knees are flexed and widely separated while the electrode is being inserted, but the legs are extended during the treatment, the attachment cord from the vaginal electrode passing down between them to one of the binding posts of the d'Arsonval connection.

Precautions in Applying Electrodes

The vaginal electrode should be lubricated with glycerine, K-Y jelly, or liquid soap for introduction into the vagina. The surface underneath external electrodes should be shaved and the skin and under surface of the electrode coated with soap lather. The umbilical depression underneath the indifferent electrode should be filled with liquid soap and all electrodes applied snugly.

Failure to observe these factors will cause a variation of from five to ten degrees in the heating effects obtained within the tissues and make for the success or failure of a valuable therapeutic agent.

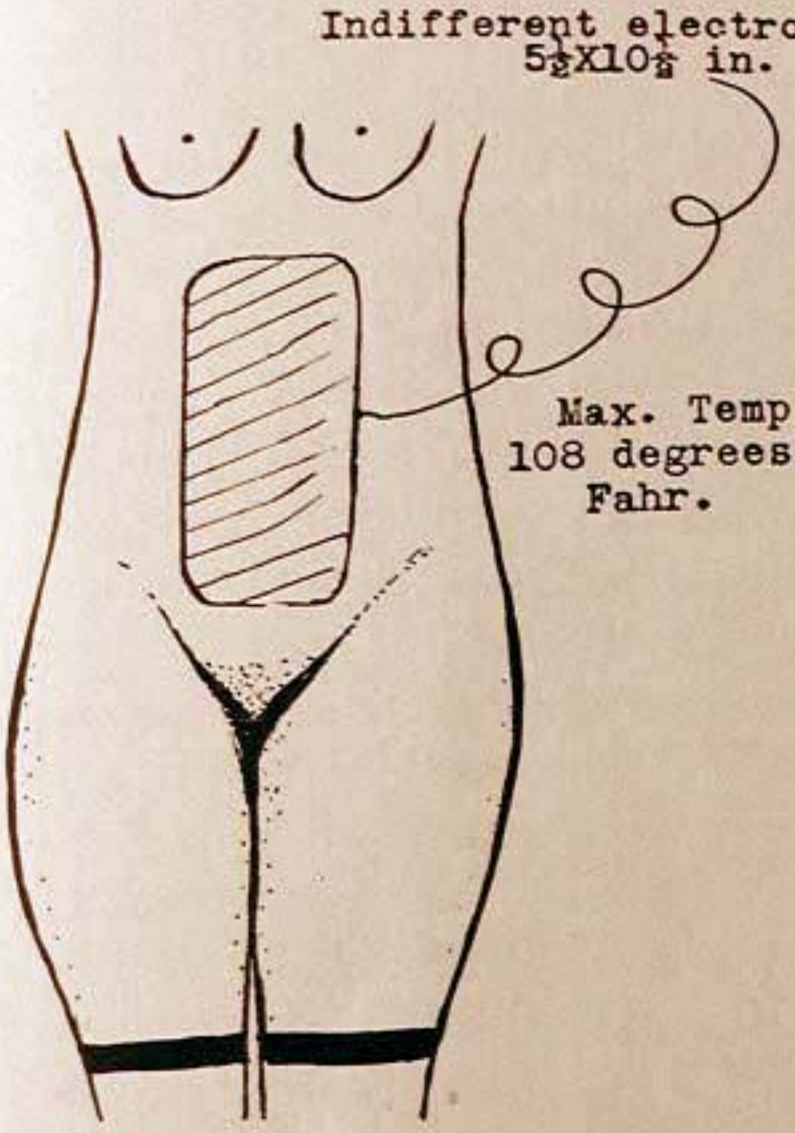


Fig. 3. Ordinary Indifferent Electrode



Fig. 4. Extra large Indifferent Electrode

The Indifferent Electrodes

The application of the indifferent electrode is almost as important as that of the active or treating electrode. Figure 3 shows the type of electrode that may be used and its proper location. This electrode is of block-tin and is 5½ x 10½ inches in size. It will allow an elevation of temperature inside the vagina of 108° F., which is sufficient to secure the required therapeutic effects. By using an extremely large indifferent electrode as in Figure 4, intra-vaginal temperatures of from 110° to 113° F. may be obtained. It has been found, however, that tissue necrosis is threatened by temperatures around 112-115° F., and we do not recommend temperatures above 110° F. for general treatments.

Where there is an enclosed abscess within the pelvis, this treatment should not be used. Chief of these is an old pyosalpinx or an abscess in the cul-de-sac of Douglas. Either of these conditions if treated by diathermy may break down and rupture inside the peritoneal cavity. These conditions should be detected by a careful pelvic examination. The palpation of a mass to either side of the uterus, or even a rigidity with slight deviation of the uterus to one side or the other, combined with some tenderness on pressure, should make one suspicious of an old pyosalpinx, and if diathermy is used at all we must proceed very carefully, as one normal treatment will often suffice to set it off. Even if there is no pus present at the beginning of treatment, the increased heat to the infected area will cause a rapid breaking down of the devitalized tissue with pus formation, and if the direction of least resistance is towards the peritoneal cavity it will rupture into it with a consequent peritonitis with all of its attendant dangers. In the event of this, the only recourse is operation and drainage. Pregnancy and ectopic gestation are also contra-indications for the use of diathermy.

The illustration below shows a typical diathermy treatment of the type mentioned on page 72. Indifferent electrode is applied to the abdomen, active electrode inserted in the vagina, with the electrical cord extending downward between the patient's knees as mentioned in the description of the technic. Cord thus aids in holding bowl of electrode firmly against cervix.



Treatment of New Growths

Surgical diathermy, or endothermy, is of extreme value in the removal of neoplasms of the female organs, many of which show a tendency to malignant degeneration. The technic is the same as for the treatment of neoplasms elsewhere and is described under the head of Surgical Diathermy.

See, also, Cervicitis Uteri, pages 51 to 55, and Uterine Cervical Lesions, page 125.

HEADACHE

Massage gently with vacuum electrode and mild current until relief is obtained. Migraine and severe headaches will require the addition of anodynes. Direct diathermy laterally through the head may be tried. Negative galvanism over the forehead. Patient may be placed on the autocondensation pad and operator may then move his fingers gently over the forehead. This type of massage is often more effective than when using the vacuum electrodes.

HEART, DIATHERMY TO THE

Gustav Kolischer, M.D., of Chicago, says, "If heat produced by a high frequency current is applied, the femoral arteries become dilated and the patient will get over the attack. This dilatation will persist for quite a while after the treatment but after a while the treatment must be repeated. While it is not a cure—we cannot change the arteries—we relieve the patient for a long time of all these dangerous symptoms. The arteries of the heart are dilated so it is important not to overdo this treatment. . . . One gets all the good results with no excessive amount of the current. . . . These treatments should not be given oftener than twice a week."

HEMORRHOIDS

George W. Bamberger, M.D., Chicago, Ill., says:[41] "Undeniably diathermy is the logical method in hemorrhoidectomy because of its simplicity, comparative painlessness and safety, and in the years I have employed it I have not found a single contra-indication to its use."

William F. Deutsche, M.D., New York City,[42] summarizes the advantages of this treatment for hemorrhoids as follows: First, the lasting effect of the local anesthetic gives the greatest assurance of no possible suffering. Second, the absence of any wound produced by sloughing or otherwise, during the post-operative period, makes the case truly an ambulant one. Third, permanent results which are proven by past experience.

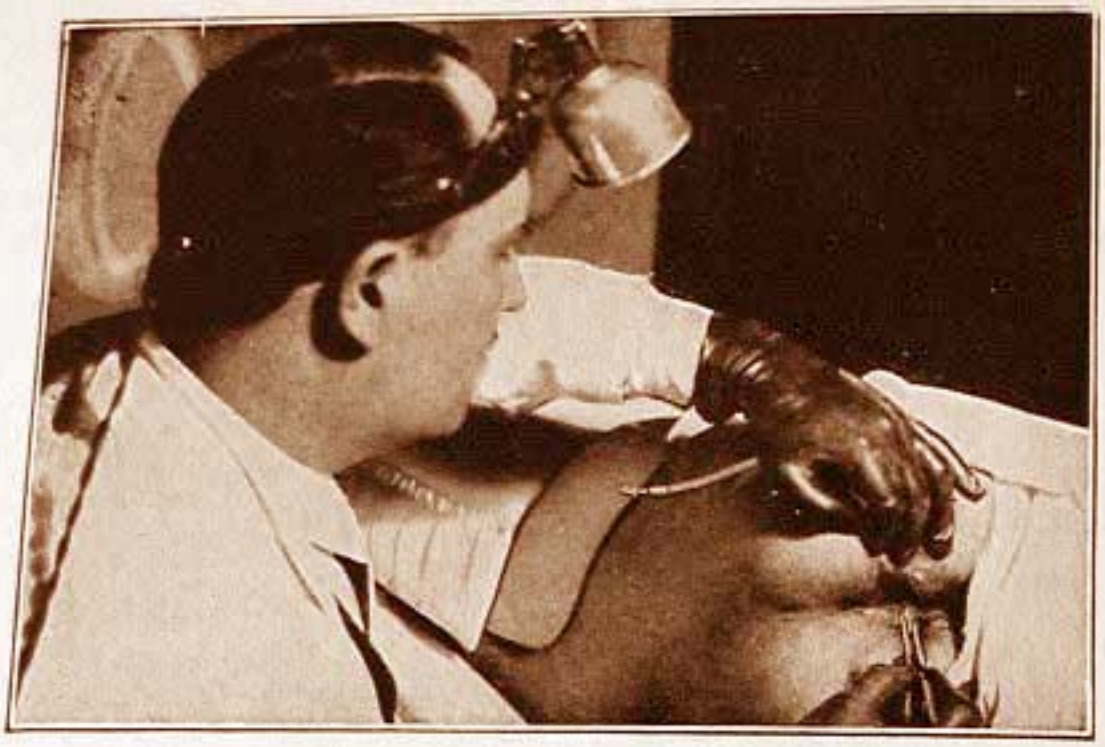
W. B. Chapman, M.D., describes his technic as follows:

During the past several years I have performed quite a number of hemorrhoidal operations by surgical diathermy or electro-coagulation, and the success that has been attained convinces me that in the majority of cases this is the operation of choice.

(Continued on page 77)

[41] Am. Jour. Phys. Ther., June, '30.
[42] Am. Jour. Phys. Ther.

HEMORRHOIDS—Continued



Exposing the pile by means of thumb Forceps

Injecting the anesthetic





Coagulating the pile by means of the needle electrode

Cleanse the field and paint over with tincture of iodine. If the hemorrhoid is inside the rectum, it may be exposed in a woman by inserting a finger inside the vagina and exerting pressure on the rectum. If a man, the cup and suction apparatus of the high frequency machine is quite effective. A good rectal dilating speculum will also secure good exposure. When the pile is exposed, grasp it with the thumb forceps (Fig. 1, p. 76) and, using a 2 per cent novocain-adrenalin solution, inject a few drops underneath the tumor (Fig. 2, p. 76). The thumb forceps should be rubber-tipped to prevent pinching. I usually cut short lengths from an old rubber catheter and slip over the ends of an ordinary tissue forceps.

For the operating instrument a sharpened Dillinger needle is very good. Any kind of a needle will do, but I employ the short pointed electrode that comes with the diathermy operating set. This becomes the active electrode of the d'Arsonval circuit while for the indifferent electrode I employ a large piece of block-tin which is warmed and held in place by sandbags. No soap lather is required for contact and it matters little where the inactive electrode is applied. It is also possible to use the auto-condensation pad or handle as the indifferent electrode, but requires much more current and results are not so uniformly satisfactory.

Using a high frequency machine at the lowest tension, set the controls so that the meter will read about two thousand milliamperes when the two electrodes are brought into contact with each other. With the current adjusted, the tumor anesthetized, and the indifferent electrode in place, insert the point of the operating needle into the pile and, using the foot-switch, apply the current until the pile turns a steel-grayish color (Fig. 3, p. 76). This only requires a few seconds. The injection solution inside the pile becomes boiling hot and by scalding destroys the endothelial lining of the dilated blood-vessel causing a coagulation and consequent disappearance of the tumor by absorption.

Hemorrhoidal tabs or "sentinel piles" are largely fibrous tissue and should be coagulated until white. They separate after about ten days and the base heals over with a soft, pliable scar. After coagulation, the hemorrhoids will protrude from the rectum and should be bathed twice daily or oftener with hot boric or cresol solution. This limits the swelling, prevents infection, and relieves pain and soreness.

If there is much after-pain prescribe a suppository of cocoa-butter containing one grain of opium and from ½ to 2 grains of

belladonna. These suppositories are on the market and can be secured from any druggist on prescription. Instruct the patient to insert one suppository into the rectum on retiring, and they may be used as often as is required to ease pain. An ointment containing morphine sulphate gr. 5, tannic acid gr. 10, in one ounce of zinc oxide is also useful.

William J. Wick, M.D., of Chicago, employs a similar technic. "We inject about 15 mm. of a 1 per cent solution of novocain underneath the hemorrhoid. After waiting a short time, introduce the active electrode. A very fine needle is required for this. I use the ordinary No. 7 or 8 cambric needle, and when through discard it. It is smoother and easier to insert than the ordinary coarse one, and does not spread over too great an area. We must not forget that a hemorrhoidal operation is a very delicate one. It is only a very small area we wish to remove. We must not go too deep, only through the mucosa into the submucosa; otherwise, there is danger of causing incontinence or infection, much sloughing and pain. After complete recovery there should be very little scar tissue. Turn on your current until complete coagulation has taken place and the pile is white. This is all that is necessary to do, and in the course of a week or ten days your patient is cured with very little, if any, discomfort or pain."

By the above procedure it is possible to treat successfully any case of piles and the patient may proceed about his daily work. It is best to coagulate only one tumor each time, the patient returning for another treatment, as soon as the soreness from the last is gone. The unfortunate thing about the treatment of hemorrhoids by surgical diathermy is that, especially, inexperienced operators will overtreat and produce so much tissue destruction at one time that the patient is completely incapacitated for several days.

Three or four treatments usually suffice to clean up even severe cases, as the coagulation of one tumor often impairs the blood-supply to several other hemorrhoids, causing them to disappear also.

Another thing, with this operation there is not the danger of hemorrhage, embolism, or infection that attends the old operative procedures, and the end-results are more satisfactory.

Galvanism is also used to advantage in the treatment of hemorrhoids.

HIP JOINT DISEASE

See Tuberculosis of The Hip, page 120.

HYPEREMIA, CEREBRAL

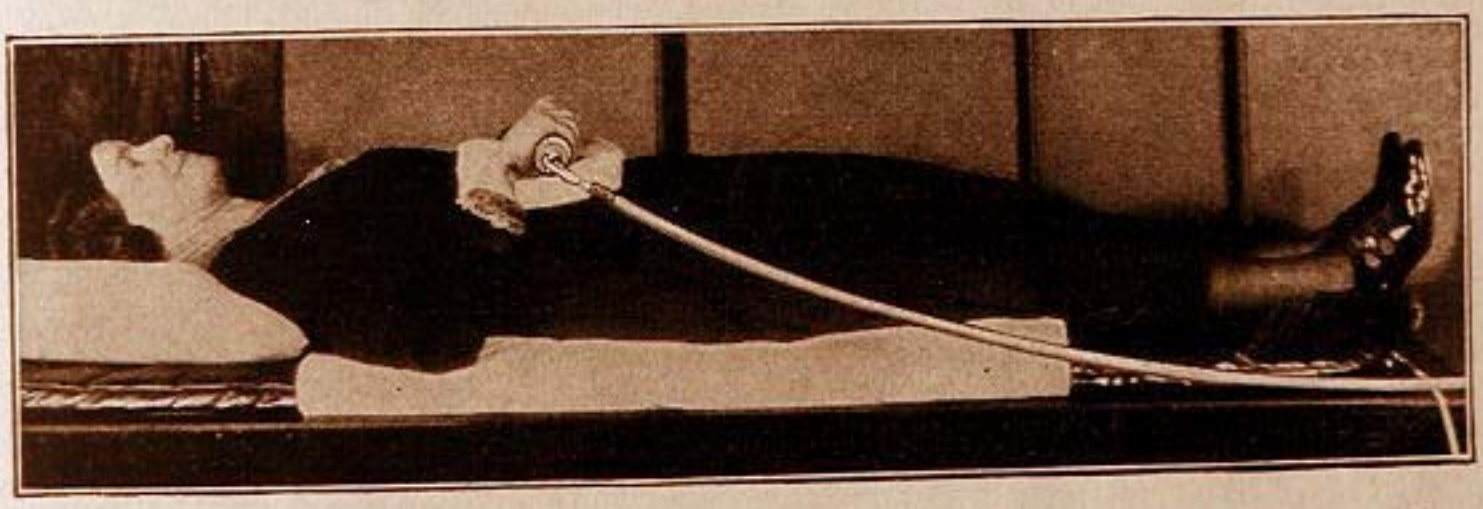
See Cerebral Hyperemia, page 51.

HYPERTENSION

Obviously the first essential in the treatment of hypertension, is to discover and eliminate, one by one, *all* the causes of the condition.

Corrective measures having been taken to eliminate the causes, auto-condensation is the method of choice in the treatment of hypertension.

Auto-condensation promotes an increase of tissue changes and an improved metabolism, with a resultant increase in elimination and removal of the basic cause of the patient's condition.



Patient lying on Auto-Condensation Pad and holding Auto-Condensation Handle in hands

It will be seen that the general rule applying to all therapeutic methods—that treatment must be preceded by careful, thorough and complete diagnosis—finds no exception in the physiotherapeutic treatment of hypertension.

Harry Eaton Stewart, M.D., New Haven, Conn., treats as follows:

Electrodes—An auto-condensation pad and a good sized metallic handle are required.

Application—Patient is placed in a comfortable position on pad, metal handle is held in both hands, a pillow or padding of some kind is placed between the hands and the body to prevent the current jumping.

The average treatment will produce a temporary reduction of B. P. of from 8 to 20 mm. Pressure will usually return to within 5 to 10 mm. of reading at previous treatment. Hyper-

tension may be kept down after reaching the proper level, by periodic treatments, some patients requiring treatment once a week, others not over once a month.

Auto-condensation current is employed of from 300 to 600 M.A. for from 20 to 30 minutes. Be careful not to lower blood pressure too rapidly as this may produce a vertigo or weakness.

Grover says: "The patient should be treated daily until the systolic pressure reaches the same point with each treatment. This will be the point of compensation for that individual. This is the point known as *fixed tension* or point of compensation, and it will be impossible further to reduce the pressure. Auto-condensation cannot impair cardiac sufficiency. When the point of fixed tension is found the frequency of treatments is so regulated that this point may be maintained."

Contra-indications, valvular heart disease, nephritis.

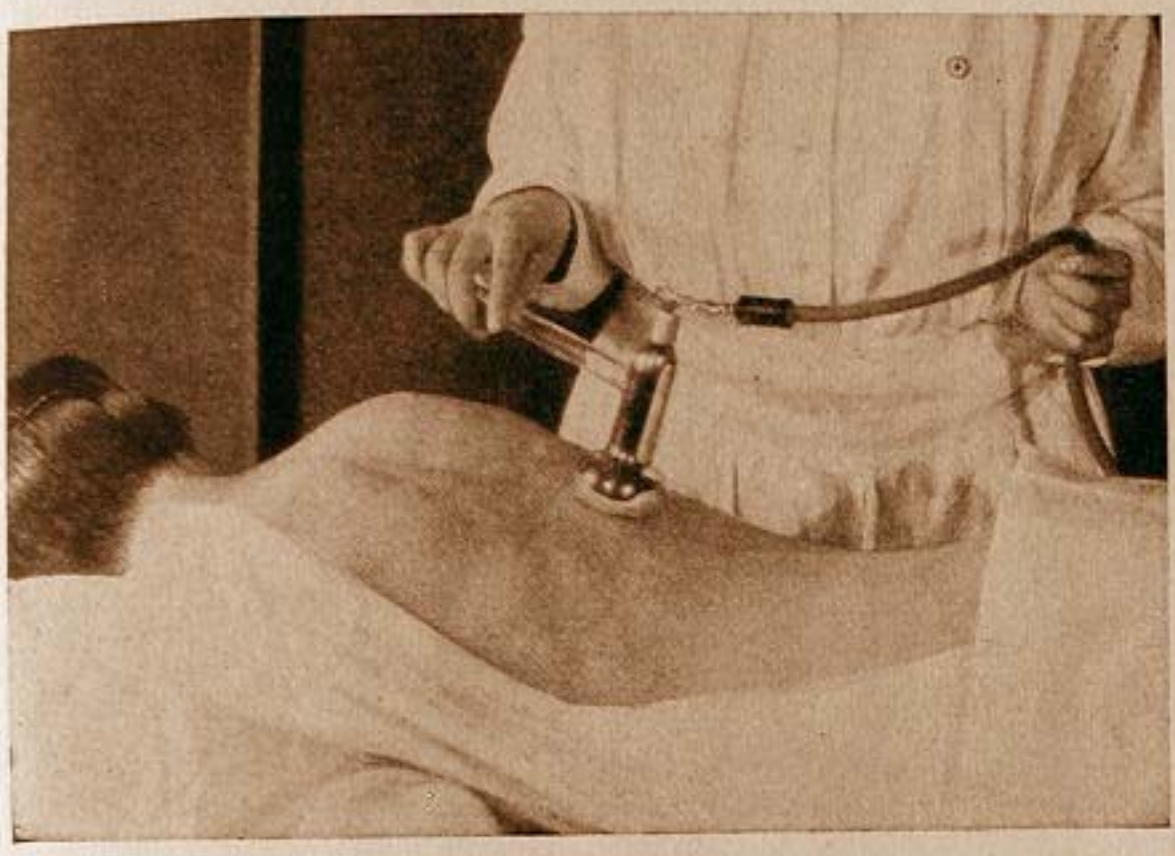
HYPERTRICHOSIS

J. C. Elsom, M.D., says: "Sometimes a mole is filled with large coarse hairs. We first remove the hairs by the following technic: the patient may be seated on the chair pad, which is connected to the central uni-terminal outlet. Enough high frequency current is turned on that will charge the patient, so that when the finger of the operator is lightly touched to the face of the patient, a little snapping spark results (an eighth of an inch or so). Or, the patient may hold a metal bar which is connected to the central terminal of the machine; this produces the same result, and requires less current. A foot switch is connected with the machine. The operator uses a small, sharply pointed needle.

"With the current off, the needle is inserted along the shaft of the hair, penetrating about 1/10 of an inch, or deep enough to reach the bulbous end of the hair follicle. Make the connection with the foot switch, with the needle in place, and avoid touching the patient's face with the operator's fingers. A second or so will blanch the tissues slightly at the point of the needle, indicating that the desired results have been attained. The current is shut off, the hair removed by a pair of forceps, and if the slight coagulation has been well done, the hair may easily be pulled out. The follicle is thus destroyed, and the hair does not return. A good many hairs may be removed at one sitting, as there does not seem to be so much irritation as is common in galvanism. When all hairs have been removed from a mole, the mole itself is dessicated. If large surfaces are to be treated, several sittings may be necessary."

HYSTERIA

Give massage to spine using surface electrode and 1/4 inch spark. Treat for fifteen minutes, moving the electrode slowly up and down the spine. If the patient does not respond, try raising the electrode from the surface and give several sharp sparks to the skin. Illustration below shows application of electrode.



Application of high-frequency electrode in hysteria

INFECTION

The role of physical therapy in the management of focal infection has an established place now that it has been shown that diathermy will destroy the infection wherever drainage is present. This is true of infected sinuses, gall bladder, and antrum when drained. It is possible to remove foci which would have otherwise required resort to surgical procedures and then with less likelihood of complete recovery than with diathermy.[43]

INFLUENZA

Curran Pope, M.D., describes his treatment as follows:

The treatment of the acute state calls for *Diathermy* in large doses several times a day. It may be given in two ways. Slip under the bed-confined patient the long auto-condensation pad. Place a large snug fitting pad over the anterior chest. Dosage 1000 to 2000 milliamperes for 15 to 30 minutes. This may be given once daily and has a general auto-condensation effect in addition to its local action. The second method is straight diathermy, with large electrodes on the anterior and posterior chest wall, both electrodes of the same size. In the chronic stage give

[43] Phys. Therapeutics, Aug., '28.

in addition to Diathermy fractional doses of the X-ray twice weekly and using blunt focus Coolidge tube, with proper filtration and protection of the patient. Actinic Light should also be employed.

INTERCOSTAL NEURALGIA

Diathermy is indicated to relieve the pain and promote a healthy hyperemia. Place electrodes where indicated and treat for thirty minutes. Skin tolerance.

INTERMITTENT CLAUDICATION

A. Wilson Gill, M.D., of Edinburgh, and L. Newell Moss, M.R.C.S., says:[44] "The onset of the cerebral attacks decided us to try diathermy, especially as we were familiar with the good effects in cases of hypertension. Following the advice of Roeser, Giraud, Vaquez, and others, we gave exposures lasting 30 minutes, the maximum current used being 1000 milliamperes. At first twice a week was considered sufficient, but later he was readmitted to the Royal Infirmary on November 6 and had this seance repeated daily for 20 days as recommended by Roeser and others. Lian and Descoust emphasize that strong currents are not necessary and advise 1200-1500 milliamperes.

"If the plates are sufficiently large there should be a sensation of heat without burning or pain, and the blood thus warmed carries the superfluous heat to the rest of the body. There is probably, therefore, nothing to be gained by having one plaque over the seat of the arterial block."

IRITIS, ACUTE OR CHRONIC

Vacuum or non-vacuum electrodes or metal electrodes may be used in the treatment of iritis. Treat for 30 minutes, using low milliamperage. Approved methods are described on pages 61, 63.

Indirect Diathermy Treatment: Place patient on the auto-condensation pad and connect it to the Tesla post and apply indirect Diathermy, using fingers of the operator for the active electrode.

JOINT INJURIES

See Orthopedics, pages 93, 94.

[44] Am. Jour. Phys. Ther., Jan., '28.

KNEE JOINT INJURIES

Treatment should be begun as soon as possible after the injury occurs, before edema and swelling have taken place. To be sure, these conditions are by no means a contra-indication for diathermy treatment, but if they can be forestalled, much pain and trouble may be avoided.

Even when the X-rays shows the presence of a fracture diathermy treatment is indicated.

Be careful, in applying the electrodes, to use a bandage that will not become tight as the limb swells. Free circulation is essential.

Employ the diathermy treatment, as described below and on the following pages, at frequent intervals until the edema and swelling have been checked or abated, which may take 36 to 48 hours.



Application of Diathermy Clamp and Electrodes to Knee

The joint may then be bandaged in the usual manner, and the patient will experience a minimum of pain and inconvenience during convalescence.

Value of Sinusoidal Treatment in Knee Joint Injuries

Three or four days later, sinusoidal treatment may be begun, applying electrodes above and below the bandages and using very light stimulation at first, until healing is well under way. In this manner, fibrosis, ankylosis and muscular atrophy are avoided.

Even in cases first seen several weeks or months after the injury, sinusoidal treatment combined with massage and manipulation will be found of distinct value, as will diathermic heat, applied before treatment to relax the parts.

Charles R. Brooke, M.D., New York City,[45] uses diathermy in knee joint injuries as follows: The cross-fire method of diathermizing joints is used. The exact technic of the method is carried out by the sequence of four different applications of the electrodes: The first treatment is given by the cuff method, cuff electrodes being placed around the leg just below the patella ligament and around the thigh just about the knee joint. The second application is carried out by placing plate electrodes above and below the knee diagonally opposite each other. The third

[45] Am. Jour. Phys. Ther., Sept., '24.

treatment is given by reversing the electrodes, and in the fourth and last application, the electrodes are placed one over the knee-cap and the other in the popliteal space. Duration of each application and treatment is 20 minutes, given singly or combined, and repeated as often as indicated.

Ewerhardt says that "Diathermy is a safe heating procedure which can be localized in deep-seated tissues at will; the degree of intensity may be satisfactorily regulated by means of suitable electrodes of varying sizes, properly applied and augmented by the cooperation of the patient. That it is a valuable measure, at least a partial control of pain, spasm, and swelling in the earlier stages of fractures and joint injuries and contributes, therefore, materially to a favorable functional end result."



Electrodes applied to either side of the knee and held in place by elastic bandage. 4½x3 inches. Give 800 to 1200 milliamperes for 20 minutes.

Also, see Orthopedics, pages 93, 94.

LARYNGITIS

Indirect Diathermy may be used with excellent results, the fingers of the operator being used as the active electrode. The fingers conform to the contour of the neck more easily than any electrode. Treat for 30 minutes. This condition is best treated sometimes, superficially, with a non-vacuum electrode over the larynx. Time, 10 minutes daily. Diathermy is especially effective in acute infectious laryngitis.



LUMBAGO

The illustration shows the large tin plate electrode slipped into place under the lumbar region, the other electrode on abdomen; treat for 30 minutes, 1800 to 2500 milliamperes, tolerance of patient.

LEUKOCYTHEMIA

See Anemia, page 30.

LEUKORRHEA

See section on Diathermy in Gynecology, pp. 70 to 74.

LIVER, DIATHERMY TO

Gage Clement, M.D., Duluth, Minn., says,[43] "The liver and the diseases which are peculiar to it are greatly benefited by diathermy, and recognition will soon be accorded it in relation to these maladies. In postoperative shock, especially after cholecystectomy, and in acute depression from any cause, diathermy raises the body temperature. Crile says that 'diathermy to the liver, by raising the body temperature one or two degrees, increases the internal respiration on which life itself depends.' Diathermy is certainly indicated in acute catarrhal jaundice. In a recent epidemic, those patients so treated became convalescent in about one-third the time required by the patients not so treated."

LYMPHADENITIS

Diathermy is of value in the treatment of lymphadenitis. When the inflammation is not very active, physicians often attempt to abort the process by cold applications or by painting the swollen glands with the tincture of iodine. If this fails, or if the glands are actively inflamed, they may be broken down by diathermy, (heat) with the formation of pus, which should be evacuated. Apply an electrode slightly larger than the inflamed gland with a very large inactive electrode on the opposite side of the body. Treat twice daily for 45 minutes, until the inflammation subsides and resolution is established. If suppuration occurs the pus must be evacuated.

MENOPAUSE, NEUROTIC SYMPTOMS OF

These symptoms are due to some effect, not clearly understood, of the interrelated system of endocrine glands on the autonomic nervous system. Auto-condensation will give as valuable a sedative effect in this condition as in hypertension, the two being closely related.

MENSTRUATION, IRREGULAR

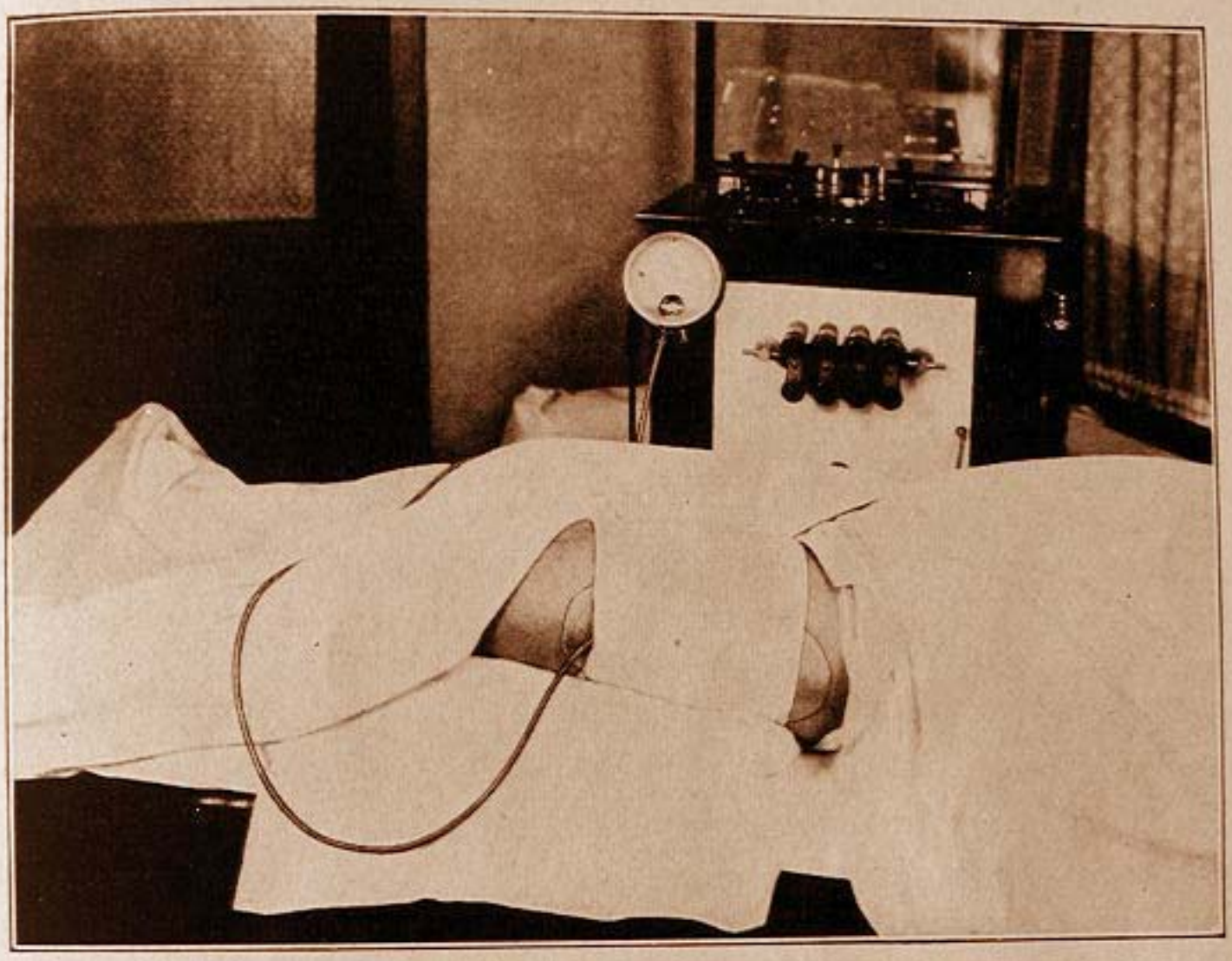
See Diathermy in Gynecology, pp. 70 to 74.

MIGRAINE

Diathermy is often very useful in this exceedingly painful condition. Apply small electrodes, or use the fingers for treating

[43] Paper, Am. Coll. Phys. Ther., June, '28.

about the head at the points of exit of the sensory nerves. Give treatments daily. When the attack is on, only strong anodynes will give any relief. Use a mild current and treat 20 minutes daily.



MYOSITIS

Above is shown application of electrodes for treating traumatic myositis of the extensor muscles of thigh. *(Charlie Horse.)*

Electrodes should be placed slightly more anteriorly than shown in the illustration so as to produce greatest heat in the extensor muscles.

MYOCARDITIS

In the light of our present knowledge of the pathology of myocarditis—that of impaired nutrition—diathermy may be accepted as a rational therapeutic agent. Numerous favorable reports have been received from physicians who have used diathermy in this condition. Almost immediate relief may be expected from the precordial pain or angina, if present, and a general feeling of relief is experienced following the treatment.

Baruch Last, M.D., New York, says[47] that cases of myocarditis of not long standing, accompanied by a feeling of oppression, painful sensations around the cardiac region, and occasional attacks of angina pectoris, are benefited by diathermy treatment.

[47] Am. Jour. Phys. Ther., Mar., '25.

Treatment: Two metal plates of nearly equal size should be used. The slightly smaller one, four by six inches, is placed in front over the precardium, and the larger one, five by eight inches, in the back exactly opposite the first one, the patient being in the prone position. The current applied should not exceed 1000 milliamperes even if the patient does not feel the heat, as the maximum dose is unnecessary and might even be harmful. The duration of the treatment should be from ten to fifteen minutes, never longer.

If it is desirable to send more of the diathermy current through the heart itself, increase the size of your posterior electrode.

Absolute rest in bed at beginning, followed later with graduated exercises.

NERVE INJURIES, PERIPHERAL

Diathermy should be given until nerve regeneration is complete. Apply block tin or mesh electrodes so as to include the affected nerve between them. When regeneration is complete, cease diathermy, as it obtunds the sensitiveness of the nerve to galvanism.

Then use the slow reversing galvanic sinusoidal through the limb from the spine to the extremity; one or two waves per second of an intensity one-fourth of that required to produce muscle contraction on the healthy side for 10 to 15 minutes daily.

Each day, just after the above treatment, stimulate the individual affected muscles, one electrode at the end of each muscle, one impulse per second. Give each muscle three contractions each day. (The muscle will not respond to motor points at this stage.)

When regeneration is complete and motor points reappear, exercise the muscle by motor point stimulation.

Then give passive, finally active motion.

NEURALGIA

All forms of neuralgia response readily to diathermic measures. Apply electrodes to include affected area between them, using two large block tin electrodes. Technic as in Arthritis, pp. 33, 34. Treat as often and as long as is required to relieve the pain, and at the same time seek the cause and treat it by whatever measures indicated. Focal infections such as are found in the tonsils and around diseased teeth should receive attention. Trigeminal neuralgia will usually require, in addition to diathermy, some opiate to relieve the pain.

NEURAL SYPHILIS

Curran Pope, M.D., describes his treatment as follows:

Give an intravenous injection of dextrose, preferably on an empty stomach or two hours after a very light breakfast. Wait one or two hours and then give, in ascending doses, neoarsphenamin. This should be followed by Cerebral Diathermy, one electrode on the forehead, the other on the nape of the neck, dosage ranges from 300 to 600 milliamperes, duration 5 to 15 minutes, immediately followed by galvanism. Careful localization of the lesion must have been made. The negative electrode is placed *nearest* to the lesion and the positive electrode on the opposite side of the skull. Dosage 10 to 15 milliamperes for 5 to 10 minutes. Other physical measures by reconstruction are to be found in hydrotherapy and the Static current. Intramuscular injections of mercury and bismuth are useful.

NEURITIS

Miles J. Breuer, M.D., Lincoln, Nebr., says, "I would advise that diathermy be used in the early stages of the neuritis, before degeneration of the nerve-fiber has taken place; this with the hope of saving the fiber from degenerating, if possible. Supposing that degeneration takes place anyway. Then our problem is different. If the nerve-cell body is intact, the fiber will regenerate, and will do so just as well without diathermy as with it. If the nerve-cell body has been destroyed, nothing will bring back the fiber. Therefore, diathermy is not indicated any further."

Arthur H. Ring, M.D., Arlington Heights, Mass., says,[48] "For pain, as in neuritis, myositis, cramps, etc., unless due to acute inflammation, diathermy is the remedy."

In all cases of neuritis whether it be of the toxic, traumatic, chronic, interstitial or exudative type, there is some edema and swelling of the nerve itself. This, together with more or less degeneration which follows, is productive of pain and various paresthesias associated. The sensory symptoms may be mild or severe, depending upon the extent of the inflammation and degeneration. The degenerative process may extend from the periphery upward involving the spinal cord, or even the brain.

Diathermy is of distinct value in relieving the edema and swelling and consequently preventing the pain, also in hastening the absorption of any exudate and assisting resolution by producing a marked hyperemia of the parts treated, all of which favors repair. In chronic cases the static wave current alternated with diathermy is of value to remove infiltrations and exudates.

[48] Int. Jour. Med. & Surg., Mar., '28.



NEURITIS, BRACHIAL

Medical diathermy. Note that position of posterior electrode is over the lower (4th, 5th, 6th, 7th and 8th) cervical and upper dorsal vertebrae, while the anterior electrode is placed well to the outer side of chest and over upper part of arm. The current then traverses region occupied by brachial plexus. Treat for 20 to 30 minutes, with from 500 to 1000 milliamperes, according to patient's condition and tolerance.

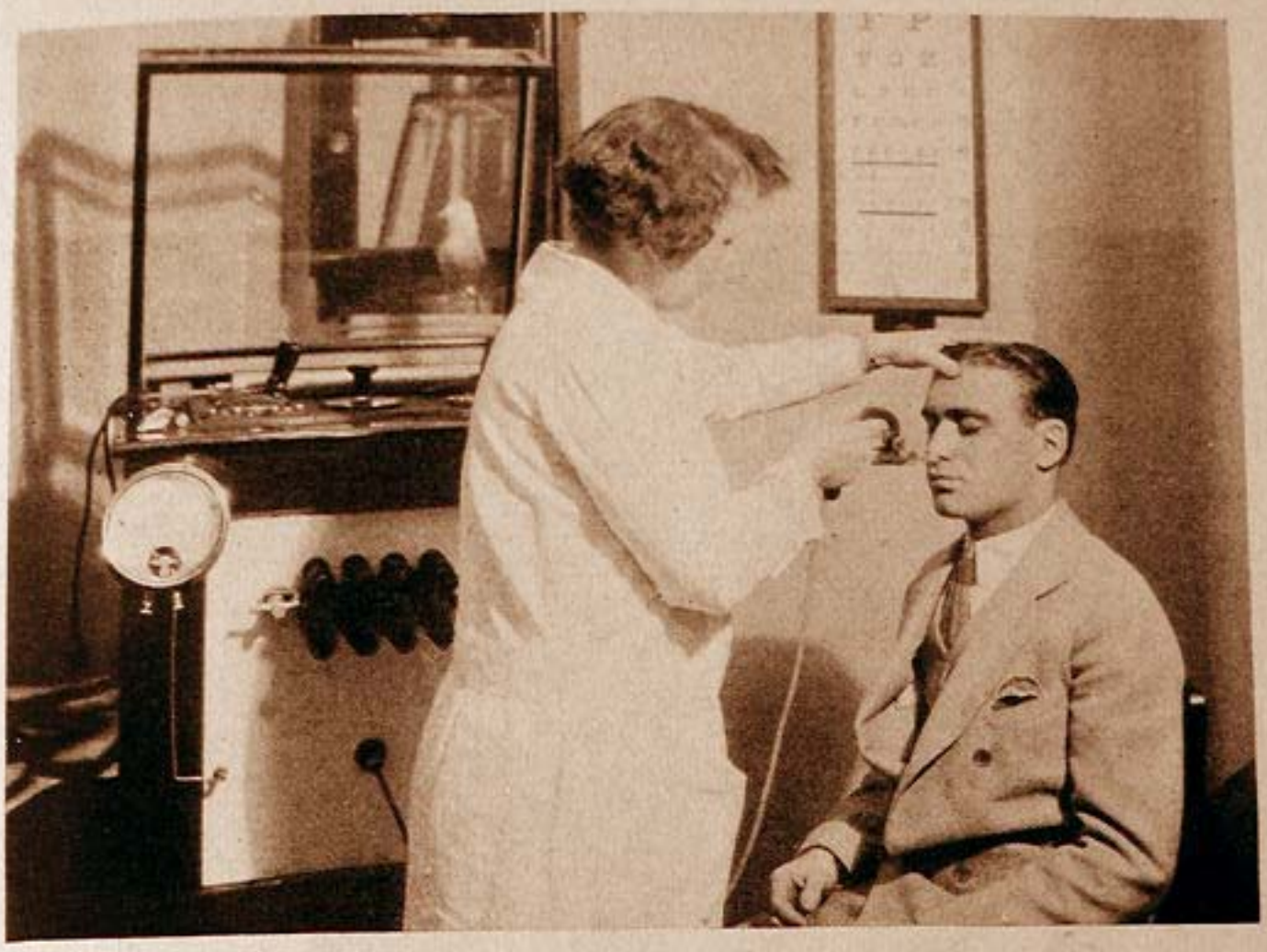


NON-VACUUM ELECTRODE

See page 61.

NOSE, DIATHERMY TO

At Left:—Treating nasal mucous membrane by indirect method. Patient is seated on the auto-condensation pad which is connected to the high voltage binding-post (monopolar) of the Fischer High Frequency machine. Holding a nasal non-vacuum electrode in contact with the area to be treated, the operator applies the current. The current is then drawn from the patient's body through the electrode to the operator, who acts as a "ground" to the current.



Above:—Monopolar diathermic treatment of nose. Special nasal electrode. Set for ⅛ in. spark or less, treat for 10 to 15 minutes, each nasal chamber. This method of treatment has been used rather extensively in asthma and hay-fever, coryza, and all so-called "catarrhal" conditions of the nasal mucous membrane.

ONYCHIA

Treat as constantly as practical until condition is overcome. The air-cooled ultra-violet lamp is used in conjunction with diathermy. Onychia is frequently a sign of systemic debility. The patient should be examined thoroughly from head to foot. Anemias, tuberculosis, severe infectious fevers, carcinoma, are frequent etiological factors.

ORCHITIS

See Epididymitis, page 62.

OSTEOMYELITIS

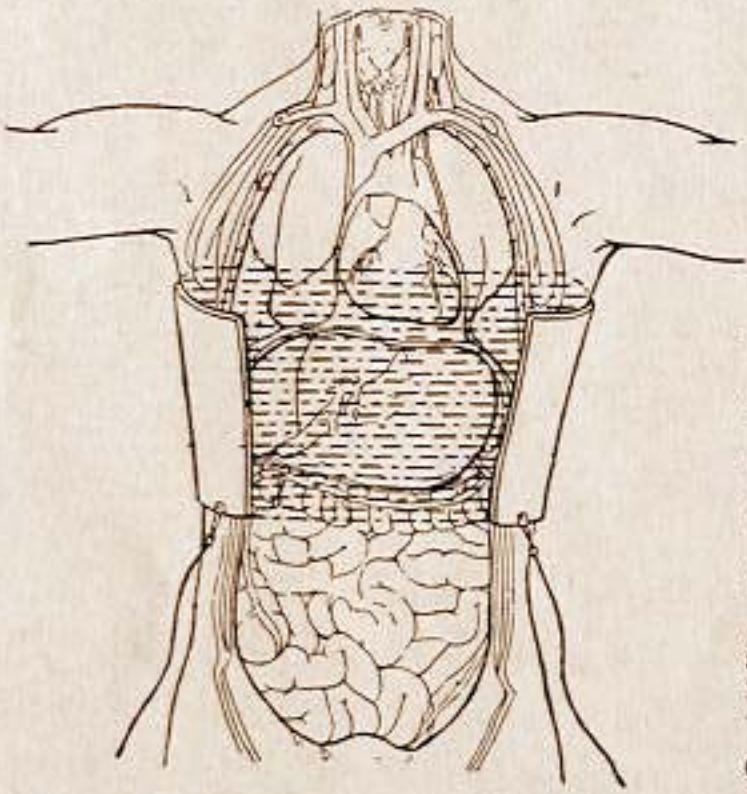
See article on the treatment of Tuberculous Osteomyelitis, page 123, for technic. In acute streptococcic or staphylococcic osteomyelitis, drainage must be established as quickly as possible. Diathermy is extremely valuable in the treatment of these conditions.

OPERATIONS, ABDOMINAL

Abstract of an article by G. W. Crile, M.D., on The Use of Diathermy and of the Quartz Lamp for Conserving the Temperature of the Viscera and Promoting the Welfare of the Patient Before and After Abdominal Operations.

It was apparent to Dr. Crile that the only satisfactory method of preserving the normal temperature of the liver during operation would be by the employment of some system which would "heat through" the tissues, more particularly the liver, without unduly affecting the outside surface. The principles of diathermy at once suggested themselves.

Diathermy, which consists of the passing of a current of high frequency through the body of the patient, has the property of heating the subcutaneous tissues without affecting the external parts in contact with the electrodes of the apparatus. Dr. Crile felt that if one of the diathermy electrodes were placed upon the lower chest on one side and the other electrode brought opposite the dome of the liver, then the current would pass through the upper abdominal organs, including the liver. Now, if this current could be continuously applied throughout the operation, the temperature of both liver and abdominal viscera in general would be maintained at or above the normal, regardless of the exposure of the intestines.



Above illustration shows effect of Diathermy current as used for "heating through" the entire field during an abdominal operation, according to Dr. Crile's method.

Dr. Crile also points out that on account of the enormous spread of the capillaries, veins and arteries very near the surface of the viscera, the blood in the whole splanchnic area almost immediately assumes the temperature of the air to which it was exposed. By the passing of the diathermy current through the liver and the neighboring viscera, this thin layer of blood would, as it were, be made to pass over a hot table so that warm blood would pass into the rest of the circulation.

In accordance with this conception, Dr. Crile and his associates have been applying the diathermy current in certain bad risk cases. They have found that the electrodes can be put in place and the diathermy current established before the abdominal incision is made and that neither the surgeon nor the patient need be aware that such a current is passing. By actual observation it has been found that the temperature of the dome of the liver can be maintained above normal throughout an extensive operation in which the abdominal viscera are widely exposed.

In Feeble and Aged Patients it has been observed that a higher incidence of pneumonia takes place following abdominal operations than after other operations of an equal magnitude.

As a possible explanation of this occurrence, Dr. Crile advances the theory that cooling of the liver results in a general depressed function of the organism together with cooling of the blood in the important organs within the chest wall. He and his associates are, therefore, now noting the effects of diathermy in lessening the incidence of post-operative pneumonia.

In feeble and aged patients after especially wide and prolonged exposure of the upper abdomen, repeated doses of diathermy are delivered through the bases of the lungs. In addition to the advantage of heat to the part, the increased temperature must tend to bring about a more active circulation in this area and thus increase the natural defense against infection.

ORTHOPEDICS

F. H. Ewerhardt, St. Louis, Mo., says:[49] (1) That diathermy is a safe heating procedure which can be localized in deep-seated tissues at will; the degree of intensity may be satisfactorily regulated by means of suitable electrodes of varying sizes, properly applied and augmented by the cooperation of the patient; (2) that it is a valuable measure, at least a partial control of pain, spasm, and swelling in the earlier stages of fractures and joint injuries and contributes, therefore, materially to a favorable functional end result; (3) that patients take kindly to it, are favorably impressed with the procedure, and their cooperation is more easily secured where movements and massage are indicated; (4) that unquestionably the period of convalescence in the treatment of fractures is materially reduced; (5) that its application seems indicated in postoperative bone and joint conditions, acute sprains, fractures, and bursitis; acute and chronic arthritis, and contractures, fibrositis, and myositis ossificans."

[49] Paper, Annual Meeting, A. M. A.

R. W. Fouts, Omaha, Nebr., summarizes the value of physical therapy treatment of bone and joint injuries, as follows: "(1) Diathermy is of value in bone and joint injuries and should be used early. It relieves muscle spasm, prevents edema and lessens pain; (2) by controlling edema and swelling, further traumatizing of tissue and the resulting fibrosis is prevented; (3) fibrosis of soft tissues may be prevented by early employment of electrical stimulation. If continued and increased in strength will prevent atrophy of the muscles; (4) in cases of long standing with fibrosis and ankylosis diathermy is of value, preliminary to massage and manipulation; (5) small doses of X-ray assist in the absorption of scar tissue; (6) massage and manipulation consistently employed are of greatest value in cases of old standing.

A. Gonnet concludes[50] that diathermy is an agent of the first order, to use in various joint diseases, especially where pain is the chief symptom, and deserves to be tried, be it at first or after other methods.

P. H. Kreuscher, M.D., says:[51] "The use of diathermy is of great value in reconstruction work where fixations of muscles, tendons and joint capsules are to be overcome. In any chronic condition where maximum heat is indicated diathermy is the method of choice."

A. O'Reilly, M.D., says:[52] "In stiff and painful joints, heat, used before massage and manipulations, has proved most useful. The author has been using diathermy immediately before a forcible manipulation under an anesthetic. In infantile paralysis heat is useful in all stages. In the acute stage baking and diathermy are soothing and beneficial. In non-purulent gonorrheal arthritis radiant heat and diathermy are valuable aids to treatment."

Frank H. Walke, M.D., says:[53] "Diathermy is invaluable for injuries to bones and the periosteum. Acute periostitis, following trauma, is very painful and, without diathermy, the soreness remains for a long time. Diathermy, however, will relieve the pain and cause the soreness to disappear quickly. In cases of fracture, diathermy, if begun early, will stimulate callus formation and a firmer union will result. And in ununited fractures, where callus is slow in forming, diathermy will hasten it. Diathermy will also do more to cure ununited fractures than operation, provided no foreign material lies between the fragments."

Also, see Knee Joint Injuries, pages 83, 84.

[50] Jour. de Med. de Paris, Aug. 9, '26.
[51] Arch. Phys. Ther., X-Ray, Rad., Apr., '27.
[52] Arch. Phys. Ther., X-Ray, Rad., May, '27.
[53] Surg. Jour., Jan.-Feb., '27.

OTITIS MEDIA

In acute otitis media radiant heat-light is the agent which affords relief and often aborts complications. Diathermy should not be applied in acute cases in which drainage has not been effected. After paracentesis or spontaneous rupture of the drum membrane, diathermy is of great value. A small block tin electrode, cut so as to fit over the ear and mastoid on the affected side, and a large indifferent electrode over the face on the opposite side, may be employed as an improvised method. Diathermy may be administered through the ear canals, but this method is of doubtful value. The method of choice involves the use of the headband and special electrodes. Treatments should be given for 20 to 30 minutes; between 250 and 300 milliamperes are sufficient, and treatments may be repeated once every twenty-four hours. This same method is of decided value in chronic catarrhal otitis media where the opening in the drum membrane is of sufficient size to permit good drainage. In acute cases, radiant heat-light should be used between the intervals of diathermy treatments.

OVARIAN NEURALGIA AND OVARITIS

Diathermy is indicated for relief of the pain. For technic, see section on Diathermy in Gynecology, pages 70 to 74.

OZENA

See Nasal Catarrh, page 50.

PAPILLOMA OF THE LARYNX

Walter Hesse[54] favors the combining effect of surgical excision and the diathermization of the base of the wound. He attributes his good results to the combination of both procedures. The value of surgical diathermy is due to the fact that it immediately helps to seal off the blood and lymph vessels by coagulation. This should be extended some distance into the healthy tissue in order to avoid metastasis of tumor cells.

PARESIS

For successful treatment with diathermy, says Drs. Neymann and Osborne,[541] properly constructed fenestrated electrodes, a machine powerful enough to give sufficient energy, and proper insulation of the patient, are required. Insulation of the patient is accomplished by means of seven blankets and one rubber sheet.

[54] Deutsche Med. Wochenschr., Aug., '30.
[541] T. A. M. A.

The electrodes are held in place with a close fitting jacket. When extensive areas of a patient are treated for long periods with large amounts of current, ranging between 4,000 and 6,500 ma., varying resistances are encountered depending largely on body thickness. The entire back must be covered by one electrode and the entire chest and abdomen by another. The region just above the iliac crest is the thinnest part through which the current will have to travel, and here burns are most likely to occur. With milliamperage below 4,000 this can be disregarded, but above this figure it is necessary to shunt a rheostat into the circuit, so arranged as to pass two-thirds of the current through the chest and one-third through the abdomen.

PERIOSTITIS

Diathermy is effective in the treatment of this condition. Give daily treatments of 30 to 60 minutes' duration. Treat to skin tolerance. Apply large block tin or mesh electrodes to include affected parts between them.

PHARYNGITIS

Pharyngitis sometimes yields to the application of diathermy locally to the neck. This can be performed with vacuum or non-vacuum electrode. The ideal treatment, however, is to irradiate the pharyngeal cavity with ultra-violet light from the water-cooled lamp, using suitable quartz applicators.

PLEURISY

In this disease, as in pneumonia, diathermy treatment directly *through* the affected area is used. Excellent results have been attained in the various types of pleurisy, relief of pain and dyspnea being afforded by each treatment. Technic is similar to that used in the treatment of pneumonia. Two large mesh electrodes, or tin plate electrodes, are so placed as to include the affected area between them. In applying the electrodes, use sufficient warm soap lather to insure perfect contact, and warm the electrodes before applying to the skin.

The current is turned on gradually and raised to the point of tolerance, remaining at that point from 20 to 30 minutes, then gradually turned off. Milliamperage will be from 1700 to 2000 at the maximum, although in some cases less may be sufficient.

Where there is marked effusion diathermy may be employed after proper drainage has been established. It must be borne in mind that the heat produced within the affected tissues them-

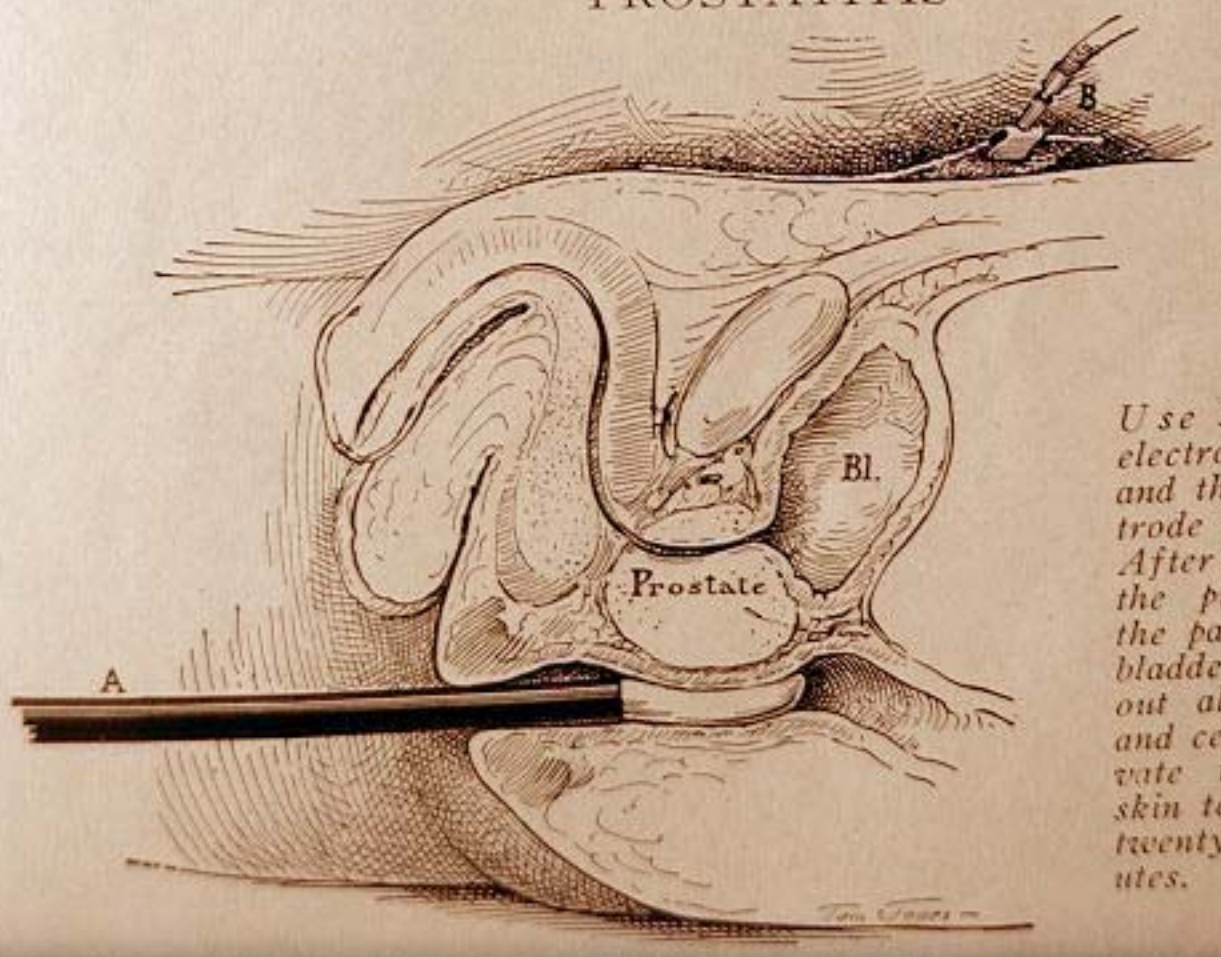
selves by diathermy, promotes increased metabolism. Diathermy should be an aid to the absorption of the effusion.

Care must be taken to prevent the electrodes from slipping or becoming detached during the treatment, which would cause sparking and might burn the patient's skin. Do not depend on the weight of the patient to hold the posterior electrode in place. A firm elastic bandage will ensure perfect contact of both electrodes.



Pleurisy: Electrodes being placed for treatment of right lung area; other plate under back.

PROSTATITIS



Use special prostatic electrode in the rectum and the indifferent electrode over the pubis. After treatment massage the prostate and have the patient evacuate the bladder. This washes out all waste products and cellular debris. Elevate the amperage to skin tolerance and treat twenty or thirty minutes.

PNEUMONIA

Harry Eaton Stewart, M.D., New Haven, Conn., in discussing the treatment of pneumonia by diathermy, says: "In only a few cases has the length of the disease been shortened, but the symptomatic relief and apparent lessening in mortality certainly justifies its employment in this disease. The value of this measure is enhanced by the fact that no other individual measures need be postponed or omitted because of its use, and it can be started immediately without waiting for typing. It is apparently equally efficacious in all cases of pneumonia including streptococcus infection, and in skilled hands seems absolutely safe. We have treated many children under one year of age, some as young as six months. Our plan is to cut electrodes to fit the chest and give about 30 M.A. per square inch. Children as a rule respond beautifully. A thorough clinical trial of this measure is advised to all who understand the technic and administration of diathermy."

N. J. Seybold, M.D., Toledo, Ohio, says:[55] "Diathermy when properly administered in pneumonia with regard to other conditions, is devoid of danger. It is never an antagonist, but always an ally. It is the only measure that will place heat with safety and uniformity between two equal surface contacts. Heat used as a therapeutic measure increases the local tissue resistance, increases cell metabolism, increases cell nutrition, and increases blood supply to the part, thereby effecting the absorption of unorganized exudates. The blood pressure, systolic and diastolic, falls slightly after a diathermy treatment in pneumonia. The respiratory rate becomes slower and cyanosis is decreased. I have noted in some of the pneumonias that cyanosis disappeared within ten minutes after beginning treatment."

Dr. Eldridge, St. Elizabeth's Hospital, Washington, reports that in 250 pneumonia cases to which he applied this diathermy treatment, only three resulted in death.

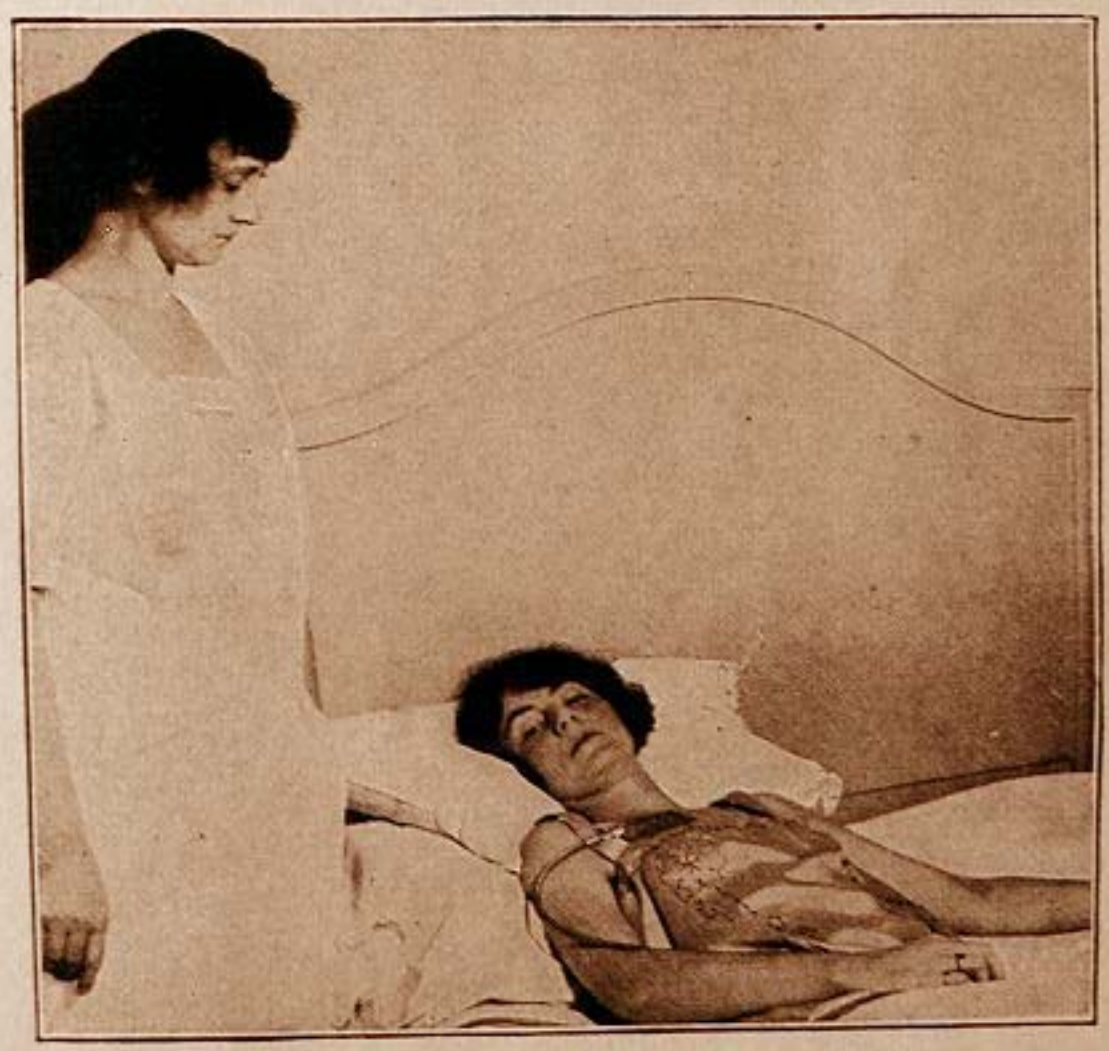
R. P. Forbes reports[56] that the percentage of complications of pneumonia was strikingly less in the series receiving diathermy treatment. These results indicate that diathermy should be considered a valuable adjuvant in the treatment of pneumonia.

Adolph A. Lilien and Joseph Echtman, New York, says:[57] "Diathermy is indicated in acute pneumonia, acute grave pneumonia, lobar as well as lobular (Broncho-pneumonia), unresolved pneumonia, chronic bronchitis, asthmatic bronchitis and in some cases of pulmonary abscess with drainage."

[55] O. Med. Jour., Mar., '28.
[56] Arch. Pediatrics, June, '27.
[57] Med. Jour. & Rec., Jan. 18, '28.

H. D. Offutt, Major, M.C., in discussing the treatment of pneumonia by diathermy, says: "The heat produced also relieves the pleuritic pain, allowing more comfortable expansion of the chest with deeper breathing, better oxygenation, relief from oppression and cyanosis and the patient often falls asleep. Heat also tends to dilate the blood vessels, allowing an increased blood supply to the involved area, thereby giving a better supply of white cells in the early stages and increasing the rapidity of resolution in the later stages."

While it is accepted as a fact by many physicians that pneumonia runs its course uninfluenced by medicine, the results obtained by those using diathermy indicate that during the first stage congestion may be dissipated by this treatment, and that the second and third stages can be very favorably influenced by its application.



Diathermy Treatment of Pneumonia

Technic

Dr. Harry Eaton Stewart says, regarding technic:

"The development of the portable diathermy apparatus to a very high degree of efficiency makes it possible for the physician, today, to give accurate and effective diathermy treatments in the home of the patient.

"Diathermy is given by means of a portable apparatus sup-

plied with a milliampere meter and capable of delivering 2000 milliamperes of current.

"For electrodes we usually employ the flexible composition metal (block tin) in sizes considerably larger than the involved areas, with edges turned over and rolled flat. This technic had led to a distinct lessening in the number of extensions to adjacent lobes. When it is necessary to treat two non-adjacent lobes, plates of the size for a single lobe treatment are employed and two separate applications of the current are given. The anterior electrode may be of flexible chain material when there is any great irregularity in the contour of the chest. The preparation of the electrodes consists in warming them thoroughly and covering them with warm, thick soap lather before applying them to the skin. The posterior electrode, clipped to the cord, is placed on a folded bath towel, the mattress depressed, and the electrode slid under the patient to its proper position without disturbing him. An additional towel or small pillow may then be crowded under it to insure good contact. The chest electrode may be gently held in place by the tips of the operator's fingers or secured with adhesive strips. Sand or shot bags and circular constrictions are to be avoided, if possible. When the patient is restless, irrational or coughing heavily, good contact must be secured in any event.

"With everything in readiness, the current is turned on slowly and gradually, employing about five minutes to reach maximum of 1500 to 2500 milliamperes. This maximum may be maintained for 30 minutes or longer, and then turned slowly and completely off. When patients are restless the cords must be so placed that it will be impossible for them to be pulled loose. In very severe cases treatment may be repeated every alternate hour. In the usual case treatments every three hours are sufficient, omitting one in the early morning. With the onset of resolution the treatments can be rapidly cut down, both in amount and frequency. In the treatment of children the size of the chest should determine the proper electrodes to choose, and a current of not over fifty milliamperes per square inch of the electrode surface given.

"The cumulative experience of the profession in the treatment of this disease has taught caution in placing faith in any one method of treatment. Innumerable methods have been tried and discarded in an attempt to lower the heavy mortality incident to lobar pneumonia.

"Clinical investigation of the effect of diathermy in lobar pneumonia offers certain advantages. Among these are:

"*a.* It is available wherever electricity is installed.

"*b.* It requires no cumbersome or very expensive apparatus.

"*c.* The technic of its application, while exacting, is neither very difficult nor complicated.

"*d.* Not a single untoward effect has followed the giving of some 1,900 treatments reported to date. We may therefore feel assured that, properly given, it is absolutely safe.

"*e.* No other part of the entire treatment regime of the patient, even including the use of serum, need be postponed or contra-indicated when diathermy is employed."

"*f.* Unlike certain other medical and surgical procedures, it has not proved its value almost wholly in the hands of one individual or institution. The writer is glad to acknowledge that a number of his co-workers have obtained a lower mortality in the treatment of their cases than he has in his own. He feels certain that what they have done may be equaled or surpassed by the profession at large."

POST-OPERATIVE PULMONARY CONDITIONS

N. J. Seybold, M.D., Toledo, Ohio, says:[58] "My first thought in postoperative lung conditions is diathermy. Over 95 per cent show immediate improvement, barring other complications."

PROCTITIS

Apply mesh-sponge to anus with large block-tin electrode over abdomen. Elevate the current to the skin tolerance and treat for 30 minutes daily. The perineum should be shaved and soap lather applied to prevent sparking. Treatment is quite effective.

PYORRHEA ALVEOLARIS

C. E. Norris, D.D.S., Indianapolis, Ind., says:[59] "In the treatment of pyorrhea alveolaris, tumors, cysts, pyogenic membranes, abscesses, etc., in the mouth coagulation offers several advantages over the well-known surgical, medicinal and mechanical methods now employed. (1) It is practically never necessary to do more than one operation; (2) most of the operations may be done under local anesthesia; (3) the instrument sterilizes as it cuts, thus tending to make the wound aseptic; (4) Hemastasis—no time is lost in the ligature of vessels as the current seals blood and lymph vessels; (5) postoperative pain is practically nil due to obtunding of the sensory nerves; (6) healing is very rapid

[58] Am. Jour. Phys. Ther., Apr., '30.
[59] Am. Dent. Surg., Apr., '28.

and scar tissue is relatively small with this method.

Treatment: When employing diathermy electrocoagulation, one terminal, which we will call the indifferent electrode, should be placed somewhere on the patient's body, care being exercised that this electrode is well fitted to avoid burning. The active electrode is used in the field of operation. This is ideal in the treatment and excision of large growths in the mouth and for large areas of infection and osteomyelitis of the mandible and maxillary bones. The active electrode in this procedure may be a needle, curette or blunt instrument. It is far better to use too little current than too much in the average case."

RENAL DISEASE

Curran Pope, M.D., describes his treatment as follows:

In nephritis and kidney infection physical measures have been found of proven value. In renal infection the blood stream, filled with bacteria, principally colon bacilli, or with toxic products irritates the kidney and produces a "pre-nephritis." The kidney eliminates toxic products and bacteria themselves. In this state general measures, especially auto-condensation, is valuable. The quartz or arc lights, or what is better, a combination of the high wattage 1500 C.P. incandescent lamp, at the same time that an arc lamp, with iron cored carbons, followed by method of using the Aix-la-Chappelle or manipulation douche will do much to clear the blood stream and relieve kidney irritation. Colon drainage is beneficial. STATIC: Give heavy sparks to spine and over liver. Follow with wave current, using two large Leyden jars, with large pad over kidney region for 10 to 20 minutes. *Diathermy* is a valuable method in kidney disease. In the acute case in bed we should use smaller amperage and shorter duration of treatment, and if necessary give the treatment twice daily. In the convalescent or ambulant patient heavy doses are indicated. A dosage of 1000-1500 milliamperes for 15 or 20 minutes is preferred, rather than a much longer time at a lower milliamperage.

Gage Clement, M.D., Duluth, Minn., says:[60] "Acute and chronic inflammation of the kidneys may be treated without hesitation with diathermy. Such treatment of these organs must not supplant the usual regimen, but must be used as an adjuvant. Renal calculi with hydrops and hemorrhage are not a contraindication to diathermy, since many reports have been made of stones that have passed more readily as a result of the relaxation that diathermy affords. Cystitis is another disease in which diathermy is indicated."

[60] Paper, Am. Coll. Phys. Ther., June 9, '28.

RECTAL DISEASES

George J. Ott, M.D., Boston, Mass., says: "The pathology varying in degree and kind, as well as location, will require a different selection and combination of modalities. This is self-evident. Mild diathermy applied by means of a metal electrode 4 x 7 inches, over the sacrum or the abdomen, and a metal electrode 2 inches in circumference and 4½ to 6 inches long (preferably hollow) in the rectum, each electrode being attached by a cord to opposite poles, with a current of from 400 to 800 M.A. passed through the pelvic area, will give decided relief in most cases of itching and burning that are so annoying, as well as many concomitant symptoms referred to distant organs. . . . Proctitis calls for diathermy, with the metal electrode inserted."

See also Anus, Fissure of.

RHINITIS

Diathermy is of value in treatment of this condition. For technic see pages 90, 91. Treat 5 to 15 minutes, using either vacuum or non-vacuum electrode and only sufficient current to produce a sense of warmth in the inflamed mucous membrane.

SACRO-ILIAC ARTHRITIS

Diathermy treatment is effective. Use large block-tin or mesh electrode under hips and a similar electrode on the anterior surface above. See page 120 for application of electrodes. Treat at skin tolerance for 30 minutes or more, daily or twice daily.

SALPINGITIS

See Diathermy in Gynecology, pages 70 to 74.

SCARS

Painful scars may be treated by diathermy. For application of electrodes, see Adhesions, page 28.

SCIATICA

R. J. Behan, M.D., Pittsburgh, Pa., in his paper entitled "Physical Measures in the Treatment of Pain," says: "Diathermy gives great benefit in sciatica. The weak current is more effective than the strong current, especially in the early stages. Sometimes the pain is temporarily increased as soon as the diathermy is applied. Pressure upon the nerve should, of course, always be avoided, and any irritating contacts with the terminal areas where sensation is more acute should be avoided."

The current may be passed anteroposteriorly through the upper part of the nerve by putting one electrode over the sacro-sciatic notch and the other directly opposite it on the anterior

surface. Or, it may be passed down the nerve with one electrode over the sacro-sciatic notch and the other a cuff below the lowest point of pain on the leg. Treat at skin tolerance for at least 30 minutes daily or twice daily. If the pain extends the full length of the leg, treat in sections. The custom of placing one electrode against the hip and another on the ankle or sole of the foot is to be condemned as the resistance of the great amount of tissue to be traversed reduces the diathermic effects to a degree where no bentfit is derived from the treatment.

SCLEROSIS, DISSEMINATED

Burton Baker Grover, in his "High Frequency Practice," says: "Up to the present time no treatment has proven of avail for sclerosed areas in the brain, but for those in the cord a modicum of relief has been found in diathermy. For technic of application we are indebted to Bergonie, who used two bare metal electrodes, one to the cervical region, the other to the lower dorsal, with a current of toleration of 20 to 40 minutes' duration.

"Bergonie's technic has been modified by Americans who have placed one bare metal electrode 2 x 8 to upper dorsal region, the other 6 x 8 to the epigastrium. A current of tolerance is allowed to flow from 30 to 40 minutes."



SHOULDER, DIATHERMY TO

At Left—Diathermy application to shoulder for concentrated heat treatment. 300 to 400 milliamperes, patient's tolerance, for 20 minutes.

SINUS DISEASE

Charles R. Brooke, M.D., states:[61] (1) Experience shows the early use of diathermy to prove that sinus disease can be eradicated before the involved structures are irreparably damaged; (2) the use of diathermy in sinus infection has shown a degree of recovery resulting that frequently surpasses all expectation; (3) diathermy with other physical measures combined or singly applied in sinus disease, has, to some extent, replaced the older measures of treatment; (4) many cases have shown that a prompt adequate relief can be obtained by the use of diathermy in otherwise seemingly incurable sinus conditions, and this has brought about much appreciation from patients who have availed themselves of this effective form of treatment.



Applying Diathermy to frontal sinus by means of head band

T. Howard Plank, M. D., San Francisco, Calif.,[62] in commenting on inflammatory conditions of sinuses accessory to the nose, says: "Diathermy is also invaluable in many cases of sinusitis. It reduces the inflammation and either destroys or reduces the vitality of the infecting organism."

Drainage is the first essential. This may be established surgically, by shrinkage, or by the use of positive galvanism, using a probe wound with a little cotton and dipped in 1/1000 solution of adrenalin hydrochloride. Insert the probe, attach to the positive pole of the galvanic current and connect the negative to a large indifferent electrode on the cheek. About three milliamperes of current is used, for five minutes. The current is then turned off slowly and the probe removed. The pus and mucus will come out on suction then, as a rule. This may be followed by diathermy, with one electrode in contact with supra-orbital region, and the indifferent electrode on the nape of the neck. Treat for 20 minutes.



Applying Diathermy to Antrum

A. R. Hollender, M.D., says:[63] "Medical diathermy is of value in acute and chronic forms of frontal and maxillary sinusitis, but must be employed with due regard for underlying factors, principally that of drainage when suppuration is present."

[61] Phys. Therapeutics, Apr., '28.
[62] Med. Herald.
[63] Am. Jour. Surg., Feb., '30.

SKIN BLEMISHES, BENIGN

The treatment of benign skin blemishes includes a wide variety of minor operations which are logically a part of the surgeon's work, but which frequently are neglected or ignored by the general practitioner. Surgical diathermy offers the ideal means of treatment, combining in greatest degree all the requirements of the operator.



Fig. 1. Drawing showing the needle applicator held a short distance away from the skin, a shower of sparks passing to the lesion.

Surgical diathermy is applied easily and quickly, is under such perfect control that even the eyelid may be operated safely, is bloodless, leaves the least possible scar and calls for little after-treatment. It is suitable for all the following conditions:

Moles	Spider Nevus	Boils
Warts	Small Angiomata	Localized Skin Infections
Papillomata	Telangiectases	
Sebaceous Cysts	Tattoo Marks	

Preceding the application of surgical diathermy, the skin should be first carefully sponged with alcohol and then dried. Local anesthesia is utilized according to the surgeon's own technic, and the skin again dried. After anesthesia is attained the operation proper is performed.

When the lesion is small, the monopolar method is used, with the current passing from the machine to the patient and thence to the ground. For larger lesions, use the bipolar method, with the current passing from the machine through the active electrode to the patient and thence through the inactive electrode back to the other pole of the machine. For the active electrode, a needle point electrode is used. For the inactive, the operator may use a large piece of block-tin, affixed firmly to patient's back or chest; or the patient may hold the auto-condensation handle in his hands.



Fig. 2. Needle applicator inserted into lesion. Multiple punctures such as this are made until entire base is coagulated.

An excellent method of dealing with these small skin lesions is to grasp the lesion in a pair of artery forceps which is connected to one of the d'Arsonval terminals, and plunge into it a needle connected to the other terminal. Thus the current and its destructive effect are confined to the portion held by the forceps, and do not extend into undesired areas.



At Right—Unipolar current used for removal of benign skin blemish where the latter is very small. Patient holds autocondensation handle in hands. Operator uses small needle electrode with just sufficient current to produce spark. Use foot switch for instant control.



Sebaceous cyst arising from the lower eye lid near the margin. Successfully removed by surgical diathermy.

When the lesion is small and superficial, the needle electrode should be held about one millimeter away from the skin, allowing the current to spark across from the electrode to the lesion. The electrode should be moved about to avoid the danger of leaving pits where deeper destruction is effected. (Fig. 1, p. 106.)

Where the lesions involve the deeper layer of the skin, as in warts, it is preferable to push the needle into the tissue at one point at the base and coagulate, repeating this process until the entire wart has been treated. (Fig. 2, 106.)

For small lesions, no dressing is necessary and the patient may wash the face as usual. If an exudate occurs under the coagulated tissue it should be drained.



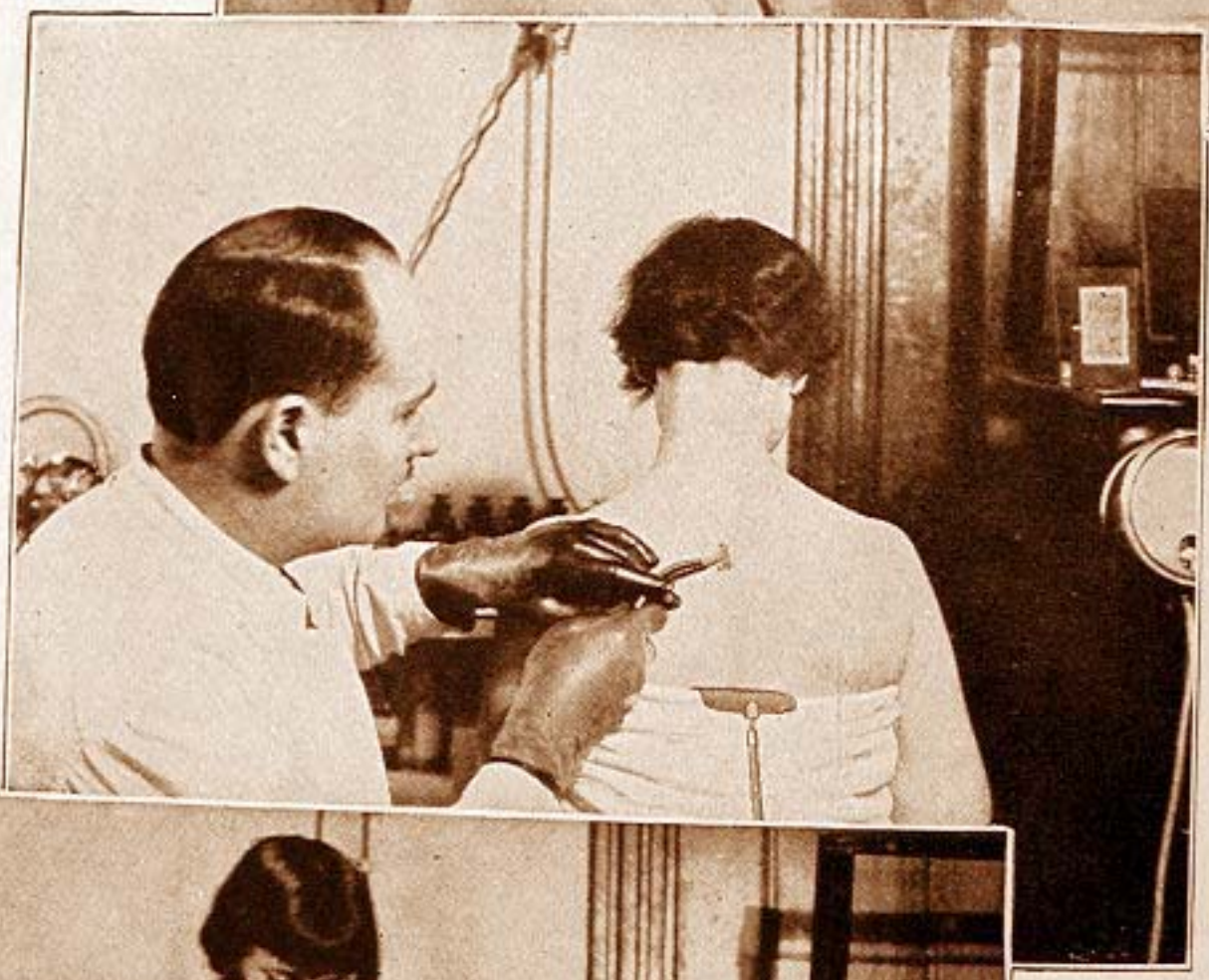
Multiple warts on palms of both hands. Successfully removed by surgical diathermy.

SKIN BLEMISHES, BENIGN—Continued



Right—Injecting local anesthetic.

Center—Coagulating with the needle-point electrode.





Left — Coagulated area after operation is completed.

SKIN, PIGMENTED GROWTHS OF

A. Benson Cannon, M.D., New York, says: "The congenital nevi irregular in shape, color and surface markings and the acquired type occurring in the popular form are usually the types that give rise to melanocarcinoma, and should be radically removed with the surgical diathermy knife as soon as they make their appearance, the wound being left open to granulate.

"Where the lesion is removed early and thoroughly in this manner, I believe that there is very little likelihood of the development of a melanocarcinoma. Any lesion that shows evidence of growth, change in color, surface markings, irritation or ulceration should be immediately and radically removed.

Of three cases of proved melanocarcinoma removed with the surgical diathermy knife by wide excision of the growth and the wound left to granulate, there has been no evidence of recurrence in 6½, 5½ and 5 years, respectively. A fourth case in which a tumor was removed 4½ months ago is also free from evidence of metastasis."

SKIN TUMORS

Dr. Richard Vallack, of Sydney, Australia, states[64] that the desirable factors for a method of treating neoplasms of the skin are: (1) Certainty of eradication; (2) minimal destruction of adjacent healthy tissue; (3) minimal resultant scarring; (4) minimal hemorrhage; (5) minimal postoperative pain; (6) speed in operating; (7) minimal resultant shock. In diathermy, properly applied, we have a method that fulfills these aims in a manner more certain than does any other technic at our disposal.

"It is of the greatest importance to use a powerful and thoroughly reliable apparatus, designed for thermopenetration.

"The methods for attacking the new growths are: (1) Electrodesiccation; (2) fulguration, or high frequency cauterization; (3) electrocoagulation."

Grant E. Ward, M.D., Baltimore, Md., says:[65] "Electrothermic methods are powerful adjuncts to the radiologist in removing slowly healing sclerotic ulcers which may or may not contain active growth."

See, also, Cancer, pages 41 to 48.

SPRAINS

Diathermy is quite useful in the treatment of sprains, it relieves the pain, hastens absorption, accelerates repair. For application of electrodes, see section on the part to be treated; wrist, ankle, elbow, etc.

[64] Eye, Ear, Nose & Throat Mo.
[65] Amer. Med., Dec., '25.

Diathermy is often very useful in this condition. Apply small electrodes, or use the fingers for treating at the points of exit of the sensory nerves. Use a mild current, and treat for twenty minutes daily. Supra-orbital neuralgia may be caused by a rhinitis or sinusitis.



TIC DOULOUREUX

Above:—Block tin indifferent electrode, shaped to under side of face. Active electrode is disc, held by operator. Toleration milliamperage for 15 minutes.

TONGUE, CANCER OF

(See Cancer of Tongue, Page 43)

TONSIL TREATMENT

Physicians who use Diathermy in tonsil infections claim a degree of success equal to that achieved in tonsillectomies, together with greater ease of operation and less discomfort to the patient. The diathermy operation is bloodless, the diseased parts are sterilized because the current used is germicidal, and singing and speaking voices are not impaired.

The patient may go about his business the same day, and the after-soreness, which is slight, will disappear within a very few days.

Frank J. Novak, Jr., M.D., Chicago, says,[66] "This conservative technic is far safer than the more rapid and, therefore, more radical method. It may then be said that because of imperative economic necessity electrocoagulation of the tonsil in some patients is a necessity. In cases of poor operative risk it is the operation of choice. For the destruction of small post-operative remnants of tonsil tissue there is no better method than electrodesiccation.

It is a valuable adjunct among the procedures available to the tonsillectomist. The progressive otolaryngologist instead of regarding it as a negligible novelty will use it in properly selected cases."

A. R. Hollender, M.D., Chicago, summarizes that "Surgical Diathermy, either as electrodesiccation or as electrocoagulation is a desirable and satisfactory procedure for the destruction and ultimate disappearance of recurrent lymphoid tissue."

Frederick B. Balmer, M.D., Chicago, says,[67] "There have been numerous objections to electrocoagulation. The technical application and the type of current employed were probably at fault. While no attempt is being made to replace surgical tonsillectomy by the electrosurgical procedure, it should be emphasized again that the latter has distinct merit in properly selected cases."

Indications

Dr. Balmer says,[67] "The indications for electrocoagulation are:

"1. Postoperative tonsillar remains, lymphoid hypertrophy, or regenerated tonsillar tissue. It is generally conceded by those having had experience in electrosurgery that electrocoagulation is the method par excellence for postoperative tonsillar remains, hypertrophies or regenerated tonsillar tissue. As previously

[66] Arch. Phys. Ther., X-Ray, Rad., Apr., '31.
[67] Arch. Phys. Ther., X-Ray, Rad., Jan., '31.

stated, it is reported that about three-fourths of all surgical tonsillectomies are incompletely performed. This percentage as given is too high for efficient operators. It will only be necessary, however, to witness some tonsil operations to be convinced that the number stated above is not exaggerated.

"2. Lingual hypertrophy and varix;

"3. Various fungus affections;

"4. Blood dyscrasias such as hemophilia and anemia;

"5. Various general conditions accompanied by serious involvement of the heart, lung and kidneys, and certain diseases such as syphilis, arthritis and sclerotic changes;

"6. The aged and infirm;

"7. The vast number of people who emphatically refuse surgical removal.

"An enormous amount of material is therefore readily available. Many of these patients would be deprived of the benefits attendant with the removal of the tonsils were it not for electrosurgery."

Dillinger Technic

The following technic which has been employed upon more than 3,000 cases by Gregg A. Dillinger, M.D., of Pittsburgh, Pennsylvania, will be found very satisfactory in electrocoagulation of tonsils.

Adjustment of the Machine

Close the spark interrupter points. Set the rheostat or the main control to about three-fourths of the full power of the machine, and make a dead short between the medium voltage and the indifferent outlets with one of your cords. Turn on the current and open the spark gaps until your milliampere meter reads 2800. Now open the switch and connect one of the diathermy cords to a piece of heavy block tin 6″x10″, which is to be placed on the patient's back. The second cord, connected to the needle, is attached to the other diathermy outlet.

Time of Contact

The consideration of importance is the time of contact with the tonsil and the active electrode or needle. (Nothing but a needle should ever be used, and see that the rubber sleeve covering it is pulled up over the end of the handle,* so as not to spark the tongue.) The time is not defined by seconds, but rather by the reaction of the tissues to the active electrode or needle; when

*Fischer's Catalog No. 744 carries the same needles as used by Dr. Dillinger, which are equipped with a bakelite sleeve that can be adjusted to or from the point of the needle as desired.

the point of coagulation is reached, a white ring appears around the needle. This requires anywhere from one to three seconds—never longer.

Anesthesia

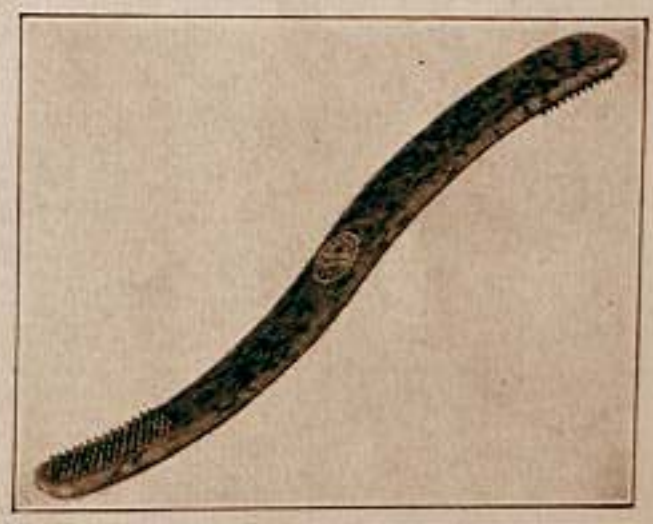
For a local anesthetic Dillinger uses a 5 per cent solution of cocaine, wetting the cotton on an applicator only once with the solution. This is quickly applied to the soft palate, around the tonsil, inside the cheek and the base of the tongue, repeating this procedure five or six times with the same pledget of cotton, but no additional cocaine. Use no more than 4 or 5 drops for the whole procedure.

Dillinger never injects novocaine, because of the slight danger from the anesthetic; because more fluid is added to the field to dehydrate; and because there is about as much reaction from the fluid injected as from the diathermy.

Details of Application

The patient is seated in any kind of office chair. The large block tin electrode is applied to the bare skin of the patient's back, and connected by the insulated cord to the indifferent outlet on the machine.

Use a wooden or glass tongue depressor. Always have a nurse hold forward the anterior pillar with a glass or hard rubber pillar retractor. Never turn on the current unless you can absolutely see the exact location of the needle. It is imperative to know where the point of the needle is, and it must always be turned more or less toward the center of the tonsil.



Tongue Depressor

Now take the needle, the end slightly curved, put it from ⅛ to ¼ in. into the tonsil, step on the foot switch. In from one to three seconds, when the white ring appears around the needle, release the current and take out the needle. This procedure is repeated until the tonsil has been covered with punctures about ¼ in. apart. The number of punctures varies according to the size of the tonsil. On large tonsils as many as twelve to fifteen may be required.

Now paint the tonsil with acriviolet, and the patient can go right on with his usual routine of the day.

TONSIL TREATMENT —Continued

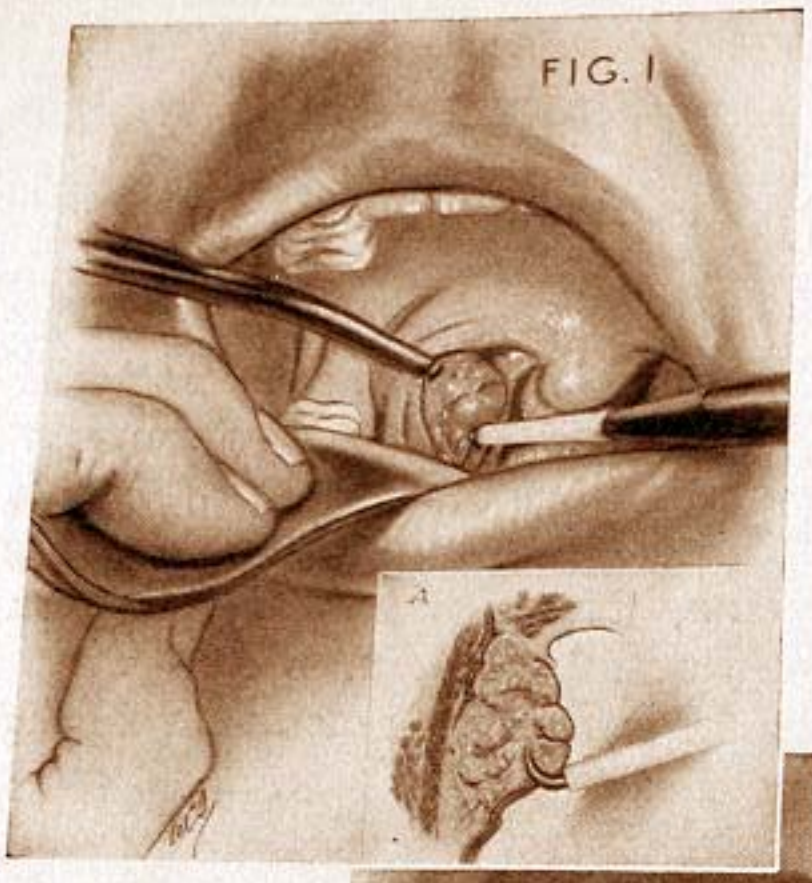


Fig. 1—First treatment. The diathermy coagulating needle is hooked into the tonsil midway between the pillars and near base of gland, pulling the tonsil slightly up out of its bed.

Fig. 2—Inspection after first diathermy treatment. Five or six areas of coagulation are seen on the face of the tonsil. These areas merge into one about 24 hours later. Insert illustrates longitudinal section showing relation of coagulated area to needle point from a single puncture.

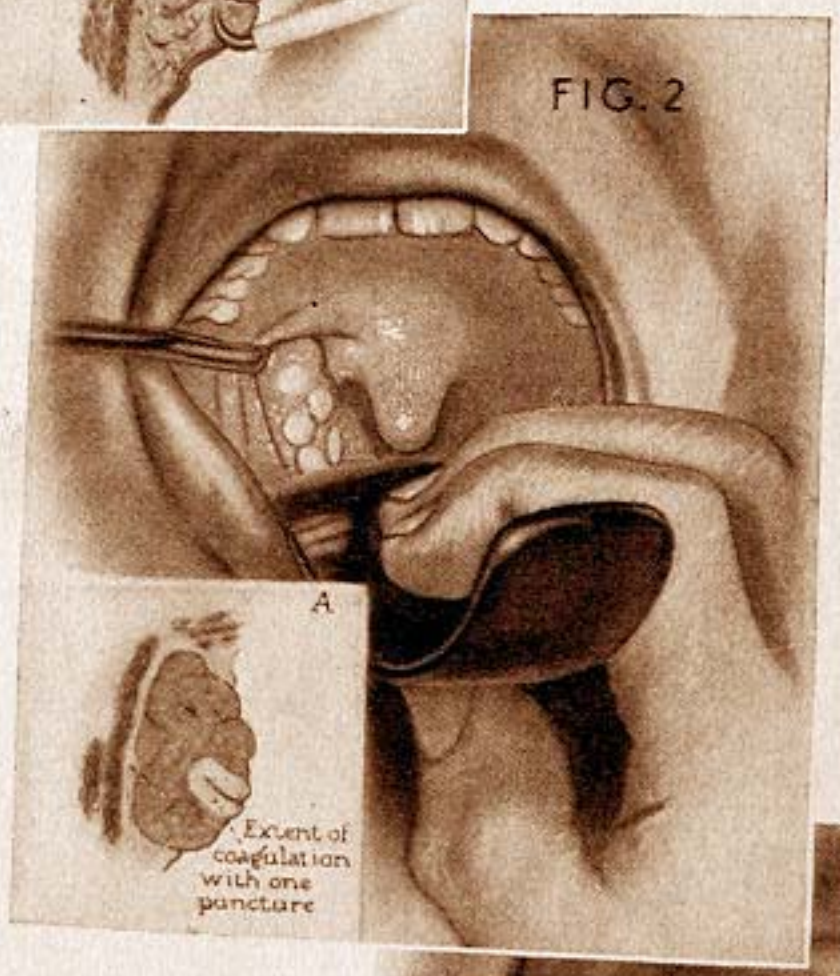
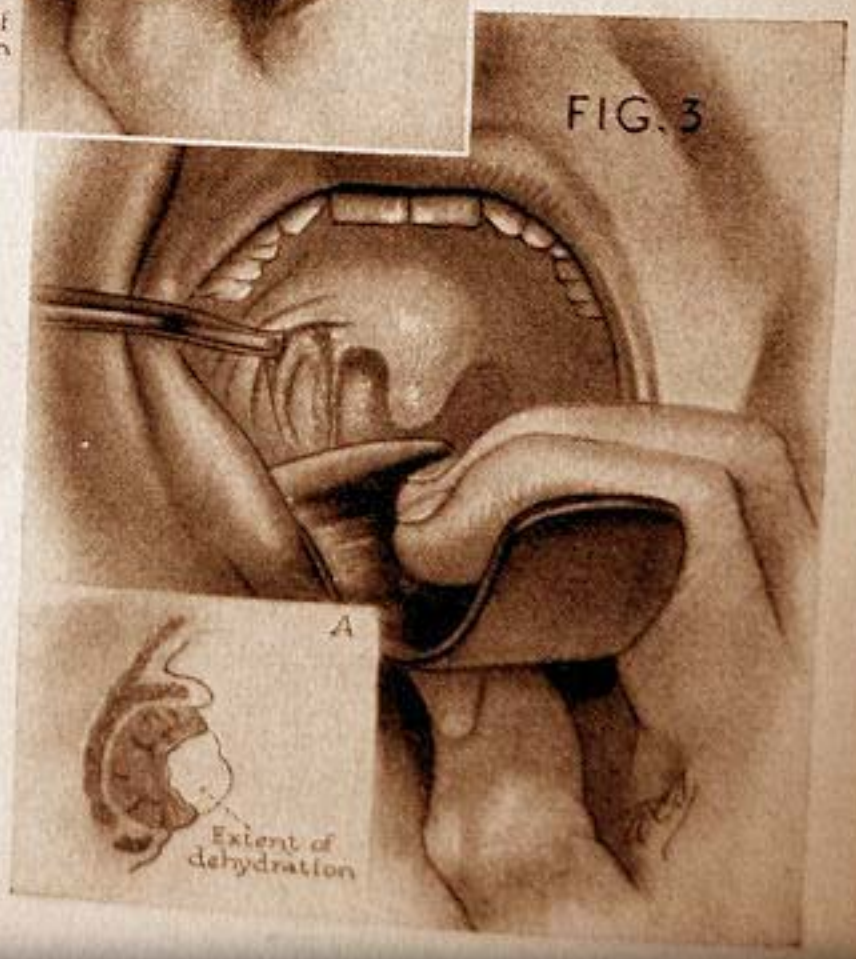


Fig. 3—Appearance of throat six or seven days after first treatment. Dehydration of the coagulated area is now complete, and the mass of tissue is reduced by about one-third.



TONSIL TREATMENT —Continued

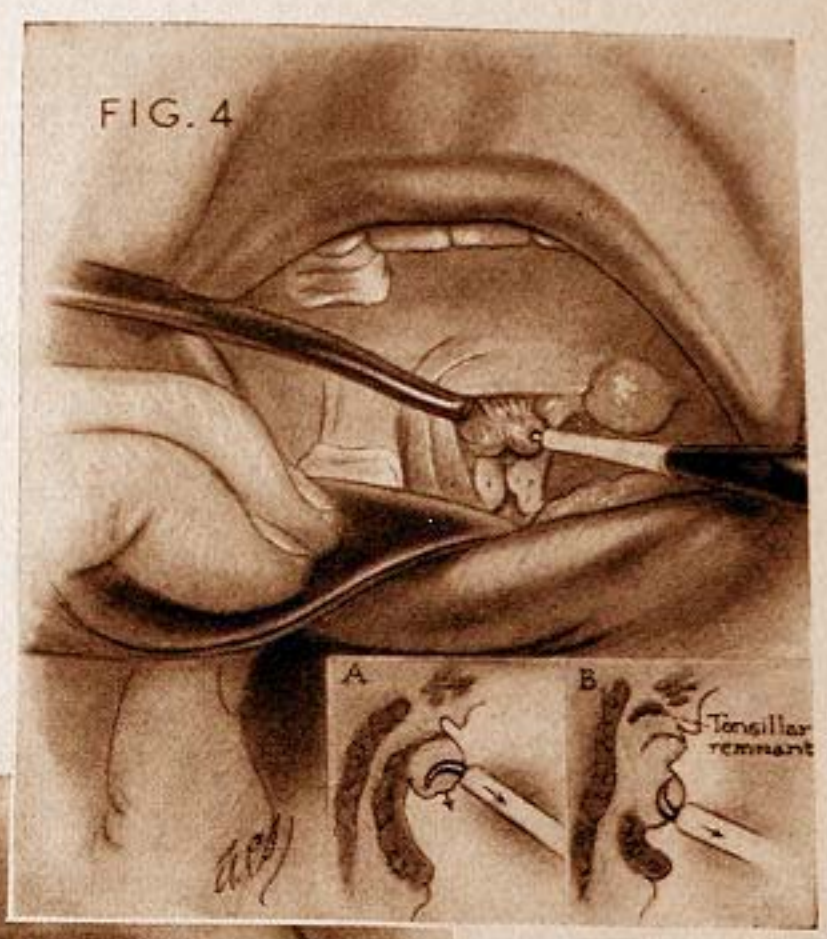
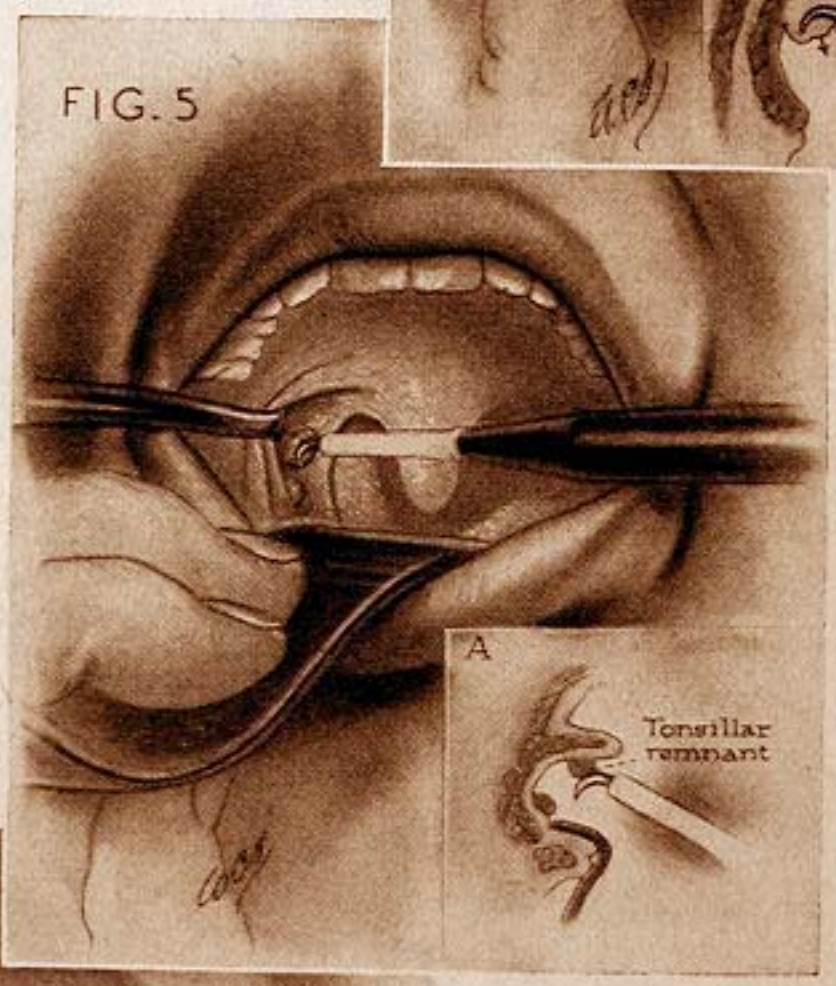


Fig. 4—Appearance during second treatment. Hooking away of the tonsil tissue is to be stressed. When treating a thin layer of tonsil tissue very careful judgment must be used as to depth of penetration of needle and duration of contact.



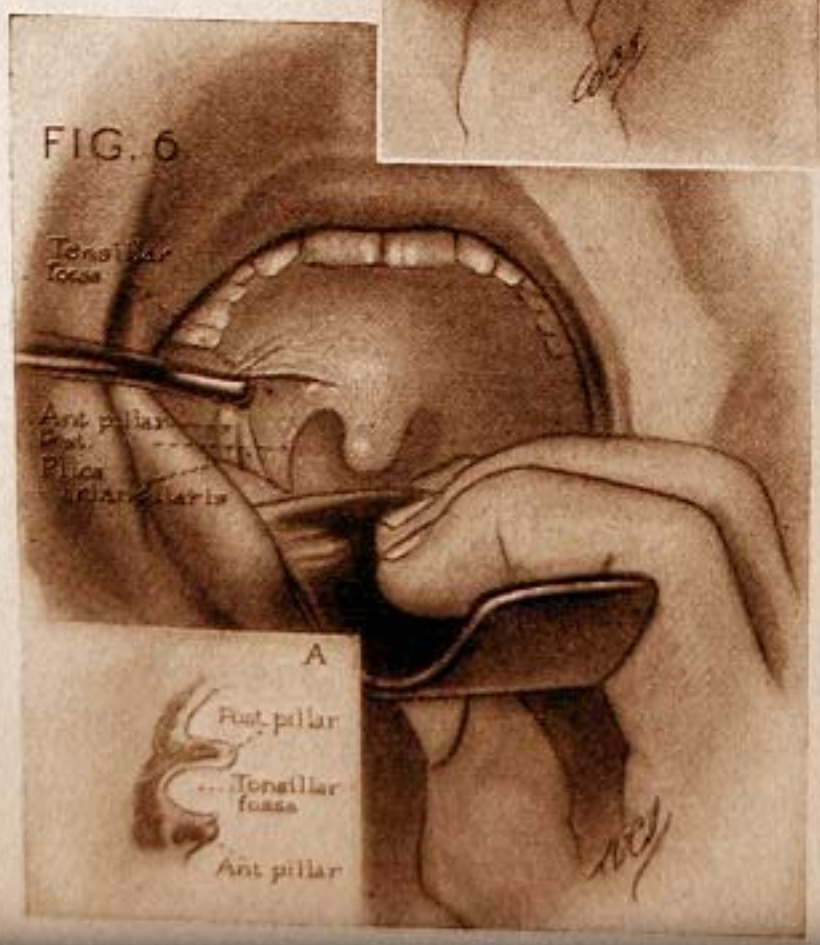


Fig. 5—After third or fourth treatment. The fossa has been cleared except for a small tab or two. To treat these no attempt is made to hook or puncture. Rest the needle on the remaining tonsil tissue and very short electrical contact.

Fig. 6—Final inspection. Fossa perfectly clean, with the posterior pillar, anterior pillar and the plica-triangularis intact.

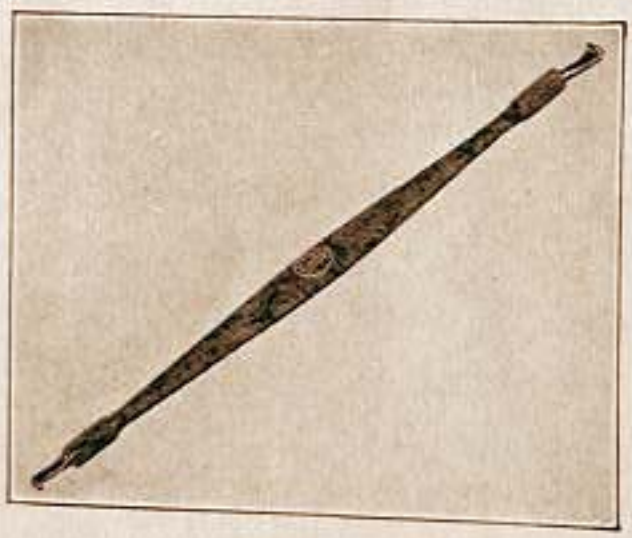
Multiple Tonsil Treatment Method Recommended

Dillinger's usual practice is to treat only one tonsil at a sitting. In seven or eight days the patient comes back; the tonsil operated upon has 50 to 75 per cent disappeared, and the other tonsil is treated. Both tonsils can be treated at one sitting and can be entirely removed with one treatment, but he strongly advises against this, as there will be greater reaction, and the patient is more uncomfortable than when only one tonsil is treated at a time. He prefers giving four to six treatments to each tonsil, and they are thus removed with no great inconvenience.

The third, fourth, fifth and, if necessary, the sixth treatment, are each distinctly different. You are working in less tissue, necessarily nearer the other throat structures; hence the need for greater care as to depth of penetration of needle. The last treatments often consist of only two or three punctures, and the last tissue that may be adherent to the posterior pillar can often be best removed by simply laying the belly of the needle against it and slightly coagulating it.

Caution

In every treatment be sure to have an assistant retract the anterior pillar, as the slightest coagulation of either pillar causes edema and pain. Do not touch the anterior or posterior muscles, and never remove the plica-triangularis. Thus there will be no scar tissue. Tissue that is adherent to these structures is easily removed with a little patience. A proper technic skillfully executed ensures success and a very grateful patient.



Pillar Retractor

Samuel R. Skillern, Jr., M.D., says,[68] "Over-coagulation or charring of tonsillar tissue favors early separation of the slough, if the coagulation has extended deep enough, and the walls of the vessels of the neck may be included in this slough, with dire results.

"Electro-coagulation is entirely a surgical procedure which can be employed for the successful removal of diseased tonsils in adult cases. With the proper technique this destructive agent is under definite control at all times, making this type of tonsillectomy a bloodless procedure, with no serious reaction, no shock, and eliminating toxemias."

[68] Va. Med. Mo.

New Bipolar Tonsil Treatment

J. A. Haiman, M.D., New York City, employs a method, which is based on the use of a new and improved Bipolar Tonsil Electrode which is self-contained; being constructed with two active curved needle electrodes which project one-quarter inch from its insulated handle, and are two millimeters apart. Such construction renders both needles active, which permits of coagulation in the space between the two needles only. This method eliminates the necessity of the large block-tin indifferent plate electrode as employed in other methods, and assures the precision of control that is requisite to good surgery.

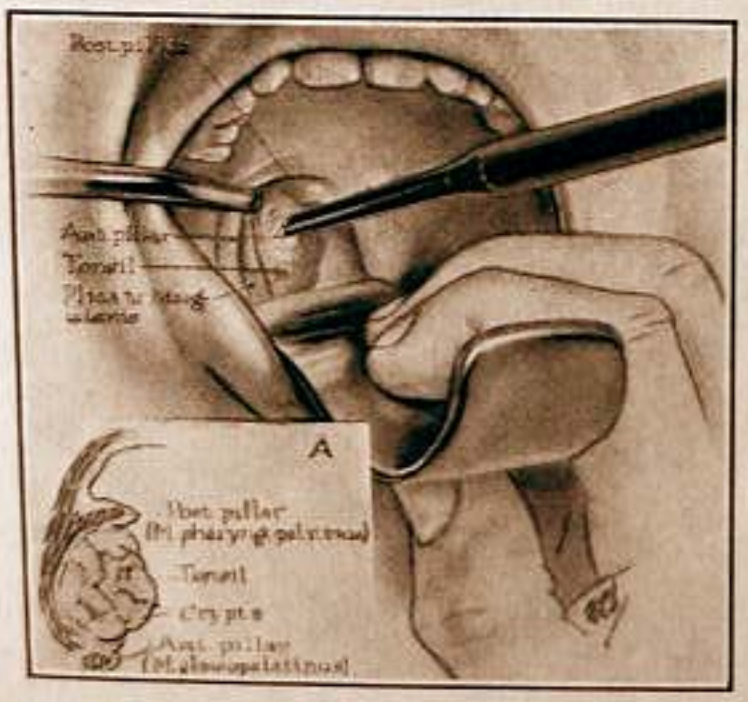
Bipolar tonsil coagulation, while being equally efficacious for the removal of small compact fibrous tonsils or large spongy hypertrophied lymphoid masses, also offers end-results comparable to a skilful surgical tonsillectomy; affords a clean, smooth, pliable fossa with preservation of normal contours of muscles of throat and without thickening these or adjacent structures.

Dr. Haiman's Technic

Under Dr. Haiman's Bipolar method the preparation of the patient is essentially the same as in the older technic, except that the Indifferent Plate Electrode is not used.

A 10 per cent cocaine solution is sparingly swabbed over the tonsil and adjacent structures.

The self-contained Bipolar Tonsil Electrode requires approximately two-thirds less current than the older technic, because the tissue resistance to be overcome between the two Bipolar needles is only two millimeters, as against the five or six inches of tissue resistance when the indifferent plate electrode is employed.



Haiman Tonsil Treatment

To establish the amount of current to be utilized, the two needle points of the Bipolar Tonsil Electrode are immersed in a small glass containing normal saline solution and the machine is adjusted to a reading of 350 milliamperes. This system permits of accurate duplication of current and affords the current reading which the machine is giving when the patient is actually in circuit thereafter.

The Bipolar Tonsil Electrode can be used to pick up the tonsillar tissue to be coagulated, and with the advantage that the double needles make this procedure considerably less difficult. It has been Dr. Haiman's practice to completely encircle the tonsil with successive insertions of the needles at intervals of about one-half centimeter, always inserting the needles from the lateral aspect of the tonsil and keeping the points toward its center, with slight but sufficient traction to relieve the tonsillar area to be coagulated, from its surrounding structure.

The Bipolar Tonsil Electrode needles having been engaged in the tonsil, coagulation is brought about by the manipulation of the foot-switch control and is carried just to the point of change of color of the tissue between the two needles,—*in never less than one second, and never more than two.* As with all coagulation technic, it is imperative that the electrode be engaged in the tonsillar tissue before compressing the foot-switch, and disengaged only after releasing the foot-switch.

Caution. Too much care cannot be exercised against over-coagulation. The objective is to coagulate just to a sufficient degree so as to divorce nutrition from that part of the tonsil which is to be destroyed, with the result that there is little or no pain or edema, and to have a perfectly clean, smooth fossa without thickening or scar tissue, when enucleation is completed.

The Bipolar Tonsil Electrode by reason of the accuracy of control lends itself readily to cleaning up remaining lymphoid tissue of the tonsillar fossae. In which case, small tabs are simply permitted to be squeezed up between the flat surface of the two active needle electrodes, without the necessity of actually inserting the needle points into the tissue.

In order that the patient may be perfectly comfortable at all times, it is advisable to treat but one tonsil at a time, allowing intervals of one week between the treatment of each tonsil. Occasionally, where desirable, both tonsils are treated at one time, following with the second treatment one week later. Usually patients do not complain of any more serious symptoms than a mild congestion of the throat, following treatment.

Several treatments may be required to remove the soft, friable type of tonsil and it is not uncommon to give five or six treatments to the very large fibrous tonsil.

Advantages of Diathermy in Tonsil Treatment

Dillinger says, "With the thin curved needle you can take away every particle of tonsil tissue and leave the pillars and soft palate in perfect, normal condition.

"Moreover, where you use the series method, with eight days intervening between treatments, you have an unobstructed view of your field each time, and every surgeon who knows the difference between muscle and soft tonsil tissue can tell when the tonsil is all out.

"Diathermy is suitable for the removal of all kinds of tonsils and in all cases, regardless of the diseases from which the patients may be suffering. There is no serious condition that I know of which contra-indicates the use of diathermy in the removal of the tonsil, except quinsy.

"This method should be brought to the attention of every general practitioner so that he may know that there is a method applicable to those cases where surgical tonsillectomy is contra-indicated, such as in the aged and infirm, in heart complications, tuberculosis, kidney disease, hemophilia, acute syphilis, and so on. Further, if this method is found suitable in the cases cited above, obviously it is desirable in all adult cases."

Dr. Balmer draws the following conclusions:

Electrosurgery is a valuable contribution to the practice of surgery, and a new adjuvant in the removal of tonsils.

The status of the orthodox surgical tonsillectomy is more secure since the advent of this method and its proper application.

A thorough knowledge of anatomy and surgical principles are prerequisite to the correct use of electrosurgical technic.

Since no procedure is ideal the surgeon should be trained to use the one most appropriate for the individual case.

Electrosurgery does not replace surgery in the removal of tonsils, but it is better suited in certain selected cases.

Electrocoagulation is the method, *par excellence*, for removal of postoperative tonsillar tissue and adhesions, lingual hypertrophy and varix, and for the extirpation of the faucial tonsil in the presence of certain diseases.

Electrocoagulation is not applicable in children, extremely nervous or refractory patients, and in patients in whom local operations are contraindicated.

TORTICOLLIS, ACUTE

Diathermy is very useful. Alternate deep diathermic applications with surface massage using the vacuum electrode.

TUBERCULOSIS OF THE HIP

Hip joint disease may nearly always be taken as an indication that tuberculous foci of infection exist elsewhere in the system. Some physicians hold that tuberculosis never is present anywhere in the body without a concurrent—or previous—infection of the lungs. Naturally, before an improvement of the hip lesion can be effected, these other focal sources of infection must be located and eliminated.



Block tin electrode, 4x7 in., is applied posteriorly as shown. Anteriorly, use block tin (shaped to body surface), held in place by sandbag.

Diet, fresh air and sunlight—all the usual physiotherapeutic measures—must be combined with local treatment. If there is pus present, as is quite likely to be the case, drainage may or may not be instituted. Patience is required in the treatment of this condition, on the part of both physician and patient.

Along with diathermy treatment, quartz lamp radiation of the entire body, the artificial sunlight treatment, is of benefit in this disease, as in all tuberculous affections.

These diathermic treatments help the tuberculous lesion by direct action. Attenuation of the bacilli is produced by the excessive temperature, furthermore, the heat automatically produces a vasodilation of the arterioles and venules with a great influx of freshly oxygenated blood to the part, as well as a concentration of the bactericidal enzymes of the blood, with a raising of the opsonic index. The vascular disturbance attracts leucocytes; phagocytic activity is increased and the infection stamped out. The heat and the healthy hyperemia favor repair. Fibroblasts are stimulated, disintegration products are absorbed, the calcium content of the tissues is raised and healing proceeds.

TUBERCULOSIS, PULMONARY

Physical therapy treatment in early pulmonary tuberculosis is of decided benefit if used with judgment in conjunction with the classic therapy of this disease. In no sense should diathermy be used alone, supplanting the excellent results obtained by the combination of rest, proper food, fresh air and sunlight, but rather supplementing these measures. Contributary causes—as infected tonsils—must of necessity receive attention. Indiscriminate use of diathermy must be avoided unless the operator has a clear mental picture of the diseased area. Confined pus is an absolute contraindication and while the danger of hemorrhage has been over-emphasized it is well to proceed with extreme caution in those cases with symptoms of hemorrhage.

The object sought in the use of this current is an acceleration of the natural action of the bodily forces fighting the disease rather than any destructive effect on the tubercle bacilli themselves. However, by relieving the area of venous stasis about the tubercle and replacing it with a fresh oxygenated blood supply which, as well as blood chemistry changes themselves, tend to inhibit the growth of the tubercle bacillus and render an otherwise favorable cultural location untenable. Locally all of nature's forces of repair are stimulated, the tubercle more firmly walled off, liberated toxins eliminated or broken up.

For a few days following treatment the symptoms increase, followed by a decrease of expectoration, cough, increase of appetite, improvement of color, lower temperature, gain in weight and a feeling of well-being very encouraging to the patient.

Treat the patient as an individual. Tuberculosis is seldom an uncomplicated disease. Technic must be adapted to fit the case. As a rule use block tin electrodes so placed that the area to be treated lies between. With patient in prone position, the upper electrode had best be weighted down by a small sand bag to maintain contact. Maintain what to the pataient is a good comfortable heat for a period of 20 minutes at first, up to seances of 45 minutes to one hour. Treat daily—and over a long period of time—persistence will be rewarded.

In the far-advanced cases, while little can be done to influence the final result, diathermy will make the patients much more comfortable both to themselves and families through the amelioration of symptoms.

Results are more striking if the diathermy treatments are followed by properly controlled applications of ultra-violet light.

Curran Pope, M.D., says: "Hydrology, diathermy and light are the best physical measures. Their combination is much better than their use alone. In acute cases the cold chest pack and actinic light. In chronic cases the dripping sheet, showers, sprays and douches, gradually reduced until the patient can take very cold temperatures for short periods.

"*Diathermy* must be very cautiously employed at first. A hemorrhage may occur but the chances are small. Commence with small doses, 200 to 300 milliamperes for five minutes and gradually increase to 750 to 1,000 milliamperes for 10 to 15 minutes. It may be given at first three times weekly, later six times weekly. The danger of hemorrhage may be lessened and the patient helped by fractional doses of X-Ray."

Harry Eaton Stewart, M.D., says, "Diathermy has been used in pulmonary tuberculosis in a few scattered cases. The reports given out regarding the result of this treatment are exceedingly optimistic. Before any such reports can be accepted at their face value very complete data are necessary in a large series of cases. In order to be free from danger even experimental work in this line must be done with these points in mind:



Pulmonary Tuberculosis — Illustration shows application of chest electrode for lesion in apex of left lung

"1. Where there is the slightest tendency to pulmonary hemorrhage, diathermy would be absolutely contra-indicated.

"2. It should never be used in the place of, but only in addition to, every other accepted means of aiding in this disease.

"3. Its association with ultraviolet irradiation in those who respond to this, is especially indicated.

"4. It would seem that the only stages of this disease logically amenable to treatment by diathermy are those of incipiency and fairly well-advanced encapsulation."

Burton Baker Grover, M.D., says, "While diathermy of a tuberculous lung hastens the elimination of toxins, it does not directly 'kill off' the bacillus. Through dilatation of the pulmonary blood vessels the lung is flooded with freshly oxygenated blood and a consequent increase of phagocytes assist in the clearing up of infiltrated areas. Diathermy is of considerable importance in the treatment of pulmonary tuberculosis, but we should treat the subject conservently." In his Sixth Edition of "High Frequency Practice," he adds: "Theoretically there is a possibility of hemoptysis following diathermy. However, the author has never seen nor heard of diathermy being followed by more than blood-stained sputum. In previous editions of this work the author has stated that diathermy should not be employed in cases of tuberculosis with a temperature over 100 degrees F. Further experience in treating this disease teaches that diathermy is often followed by reduction of temperature. I have seen cases where a temperature of 103° F. was reduced to 100° F. by one treatment of diathermy. Walled-in pus still remains as a positive contraindication to its use."

TUBERCULOUS OSTEOMYELITIS

This malady, formerly considered as a case for surgical intervention, plaster casts and weights, has yielded to physiotherapeutic treatment to a gratifying extent. Naturally, after diagnosis has been confirmed, the usual steps are taken to regulate diet, elimination and contributory causes such as tuberculous infections elsewhere in the body. The diathermy treatment is perhaps best illustrated by quoting a typical case:

Patient aged 12 years. Left knee swollen and painful since two years of age. At times quiescent, but never reduced in size to normal, and on the least exposure to cold, or if over-exercised, the knee would swell, become red and extremely painful and child would be confined to bed for weeks. A diagnosis of tuberculosis of the bone was made by X-ray, and diathermy treatment prescribed. Plate electrodes cut from block tin and shaped to the contour of the leg were applied on each side of the swollen portion of the leg and held in place by an elastic bandage. 1500 milliamperes of current was passed through the leg for thirty minutes each day for six treatments. A red spot appeared after the third diathermy treatment which became necrotic in the center. This was lanced, a quantity of pus evacuated and sterile dressings applied until the sinus healed.

TUBERCULOUS GLANDS

Tubercular adenitis, if seen before suppuration has taken place, and the gland and adjacent tissues have broken down, can frequently be aborted by the combined use of X-rays locally, and the ultra violet ray given as general body radiations. If suppuration occurs or has occurred, the abscess should be aspirated, passing the needle through healthy tissue into the pus pocket, to avoid producing an open wound and mixed infection.

Ultra violet ray is invaluable in these cases. Diathermy is of value after drainage, either spontaneous or induced, has occurred.

TURBINATES, HYPERTROPHIED

Anesthetize the mucous membrane and, using a pointed electrode, reduce the turbinate by electro-surgical coagulation. For technic, see surgical diathermy.

Butyn 2% or cocaine 1% with adrenalin is applied locally on cotton as a tampon for 5 minutes. A diathermy plate, 3x6 inches, is now applied to the back of the neck and attached to the indifferent terminal by an insulated cord. A second cord is attached to the medium voltage pole and the other end in the holder of the Applicator. The current is now tested out by shorting the Applicator upon the indifferent pole. The rheostat set on 1, and the fine adjustment on the condenser should be set with a fine spark so that the milliamperemeter will read 400. Now advance the rheostat to the 2nd and 3rd button so the milliamperemeter registers about 1200 or 1500. This will give you a high milliamperage with a low voltage.

Separate the nasal alae with a nasal speculum and apply the Applicator to the affected turbinate, flatwise with gentle but firm pressure, keeping away from the septum.

With foot switch, test the patient out with one or two short flashes. If tolerated without pain hold the current on for about five seconds. One application to an area is sufficient. Then move above or below or posteriorly as the size of the turbinate may require and repeat the application.

Upon the second day the mucous membrane becomes swollen and congested but from the third day on for two weeks the membrane gradually shrinks until a free air passage is obtained. The after treatment consist of a douche or wash with normal salt

solution and every other day swab out the nasal passage with 10% argyrol solution; and thus observing the patient, you will note a gradual atrophy of the thickened membrane taking place and your patient will tell you he breathes better and has more air space.

In Drs. Beck and Guttman's turbinate reduction by coagulation with surgical diathermy currents, a long fine surgical needle insulated to within one-eighth of an inch of the point, is mounted upon a suitable base for use in the Dillinger Coagulation Handle. This needle is introduced at the anterior base of the turbinate to the length of the turbinate, and then the currents are turned on and coagulation takes place as the needle is withdrawn thus creating a ridge of coagulation within the turbinate next to the bone, which results in the creation of fibrous tissue and the natural reduction of the turbinate with no damage to the mucous membrane except at the point where the needle has entered. If care is taken during withdrawal to prevent coagulation at that point, you will have no loss of mucous membrane.

ULCER, DUODENAL

See Duodenal Ulcer, page 59.

UTERINE CERVICAL LESIONS

See Cervicitis, pages 51 to 55.

Frank M. Mikels, M.D., Los Angeles, says,[69] That electrosurgery is the most conservative method for the treatment of uterine cervical lesions. Electrosurgery is more efficacious in treating erosions and chronic infections of the cervix than any other method. Electrosurgery destroys infection and produces an end-result which does not impair the function of the musculature of the cervix. Electrosurgical methods of treating the chronic Neisserian infection has proved reliable. The final results of extensive coagulation of cervical erosions complicated with lacerations do not interfere in any way with successful plastic operations for repair but leave a clearer and cleaner field for this procedure.

The medical profession as a whole and obstetricians or gynecologists in particular should give electrosurgery as a therapeutic agent careful consideration and respectful recognition in so far as it is valuable as a method of conserving the function of the regenerative organs and preventing the incidence of cancer of the cervix.

[69] Am. Jour. Surg., Dec., '29.

URETHRITIS

For female, see section on Diathermy in Gynecology, pp. 70 to 74. In treating the male, see section on Gonorrhea, pp. 67 to 69.

VAGINISMUS

See Diathermy in Gynecology, pp. 70 to 74.

VAGINITIS

See Diathermy in Gynecology, pp. 70 to 74.

VARICOSE ULCERS

Diathermy may be employed for relief of the pain, and to increase local nutrition and metabolism but compression and drainage of the engorged veins is essential.

L. J. Belknap, M.D., says, "I have treated many cases of varicose ulcers of the leg with prompt results with diathermy, using 500 M.A. from 20 minutes to 40 minutes, followed by ultra-violet local and body. The diathermy seems to powerfully stimulate nutrition and increase the circulation in the leg."

VARICOSE VEINS

See Varicose Ulcers, above.

VESICULITIS, SEMINAL

Apply mesh covered sponge electrode to anus or special prostatic electrode in the rectum inserted so as to come in contact with the vesicles of the two sides successively. Large block tin or mesh electrode over abdomen. The perineum should be shaved and soap lather applied to prevent sparking. Treat with bladder distended. After treatment, have the patient evacuate the bladder. This washes out all waste products and cellular debris. Elevate the amperage to the skin tolerance and treat twenty to thirty minutes. It is also possible to treat this condition with the special prostatic electrode, but the above procedure is more comfortable to the patient.

WARTS

See Benign Skin Blemishes, pp. 106 to 108.



WRIST AND FINGER, DIATHERMY TO

At Left—Electrode on wrist, other in basin of water in which finger is immersed. 200 milliamperes for twenty minutes. Patient must be cautioned against lowering other fingers or hand into water or touching pan as a spark will be produced that is unpleasant, and always startles an inexperienced patient. The older patients learn to avoid this. (Chapman Clinic)



WRIST AND FINGERS, DIATHERMY TO

At Right — Cuff electrode around wrist, hand resting on sponge in basin of water in which other electrode is immersed. Fingers are inserted in water to desired depth, to bring heat to affected joints. 500 milliamperes for 20 minutes.

WRIST, DIATHERMY TO

At Right — Cuff electrode to wrist, hand immersed in basin of water containing other electrode. Heat is thus concentrated at wrist joint. 500 to 700 milliamperes for 20 minutes.





WRIST, DIATHERMY TO

At Left — Showing application of two electrodes one on either side of wrist, held in place by elastic bandage. 600 milliamperes for 20 minutes.

DIATHERMY

By

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Read before the New England Association for Physical Therapeutics
December 18, 1923

Reprinted from The Physiotherapy News Bulletin

DIATHERMY

By Frank B. Granger, M. D., Boston, Mass.

Diathermy, or internal baking, has masqueraded under a number of synonyms such as diathermia, thermo-penetration, thermo-faradic (as its name indicates, a poor diathermy), endothermy, etc.

While it is a high frequency current, ordinarily of the D'Arsonval type with a fairly high voltage and milliampereage, yet in practice it varies widely. dependent upon the construction of the high frequency apparatus employed. It is evident that a machine wound to give a high milliamperage and a relative low voltage will have less ability to overcome resistance and consequently less power of deep tissue penetration than one constructed to deliver a much higher voltage with a somewhat less milliamperage. It should have voltage enough, however, to insure its passage in parallel lines from one electrode to the other. In all other electrical currents, except perhaps the static, the electrical lines of force do not go in straight lines through the tissue from electrode to electrode, but are diffused in widely divergent ones, and are only concentrated at the points of contact of the electrodes. Hence it necessarily follows that the deeper structures are much less under the influence of the electrical current. Diathermy, on the contrary, provided as stated above the voltage is sufficient, flows in a straight line from electrode to electrode and the intervening tissues are generally well heated with of course a greater intensity of heat nearer the smaller electrode. It is this process of generating heat *within* the tissues that makes diathermy so valuable. All other forms of heat are to a great degree blocked in their penetration by the skin, whether they are conductive heat such as the hot water bottle or electric heating pad, or convective heat such as incandescent light applicators or the arc light. Diathermy, however, is true conversive heat, that is, heat generated in the tissues, hence it penetrates deeply and to a great degree uniformly.

The penetration and clinical results of the infra red rays, despite generous advertising is still a mooted question.

Diathermy then is a high frequency current ordinarily of the D'Arsonval type with sufficient voltage to overcome tissue resistance, and with sufficient ampereage or quantity to heat, because of internal tissue resistance, the structures through which it passes, as it flows in straight lines from one electrode to the other.

Diathermy may be divided into medical and surgical diathermy. Surgical diathermy which includes electro-coagulation and dessication will not be considered in this paper.

Medical diathermy may be divided into direct and indirect diathermy. The indirect type will also be omitted in this paper, autocondensation being the most important example.

METHODS OF APPLICATION OF DIRECT DIATHERMY

1. Lateral method
2. Double cuff method
3. Cuff and water method

Of these the first, the lateral method insures the greatest concentration of heat to a given local area in the shortest time. The cuff method is also efficient but requires a much longer time of application. The cuff and water method is the least efficient. It is ordinarily used where the toes or fingers are to be diathermatized.

MATERIALS

Only a metal contact should be employed such as block tin, preferably 22 gauge, Crooke's metal, organ pipe metal, limpit metal, or metal mesh. The interposition of moist cotton, felt, or asbestos increases greatly the chances of a burn. Either one or two things may happen. The pads may become dry, more resistance ensues, carbonization takes place, and the tissue is showered with fulgeration sparks; or as has happened with the asbestos type, the metal back may become disintegrated and the area of contact be thus greatly reduced in size with consequent concentration of current strength, and an electrocoagulation of the part under treatment. Great care should be taken in preparing metal electrodes. They should not have any sharp edges. They should be perfectly smooth so that no undue pressure might be exerted. If they have been used before, good contacts should be ensured by smoothing them with a squegee, or even a large static spark ball. In hospital practice the skin is well lathered before the electrodes are applied. In the office, where there is presumably less rush and Aides with wider experience, the electrodes are dropped into basins of hot water in order that the metal may feel warm, and are placed in position with only the small amount of moisture present which may cling to them. If the current is gradually turned on, the resistance of the skin should be overcome without any discomfort to the patient. If the part is hairy it should be well lathered or shaved. The electrodes should then be bound on with an elastic bandage such as the Ace. A paper or cotton bandage may also be employed. I ordinarily use a cotton bandage or a rubber strap (old inner tubes are handy for that purpose). The contacts should be exact, and if the patient complains of burning or prickling the metal should be firmly pressed against the skin over the area in question. If this does not give relief, the metal should be reapplied. This is important, for if the metal is not in close contact with the skin, the passage of minute sparks will in time either fulgerate or coagulate, and a high frequency burn will ensue. These burns are not ordinarily harmful, unless they are deep enough to cause a scar, but they are bad technic. If by any chance the skin is anesthetic, the greatest care should be employed. Much has been written concerning the swelling of the tissues under the diathermic electrodes. I think that this has been overstated, and it is much better to bind on snugly enough to secure good contact, thus avoiding a burn. As stated above it is better to use a bandage which is somewhat elastic. A gauze bandage may exert undue pressure on some part, and from this excessive pressure and the resultant ischemia, a burn may result. For this reason also it is well to avoid bony prominences.

DOSAGE

From 50 to 100 milliamperes per square inch of contact is ordinarily sufficient. If the arteries are sclerotic, 50 milliamperes is better than 100.

SPARK GAP

The spark gap should be in good working order, special attention being paid to its cleanliness. It is better to have the spark gaps fairly close and to increase the amount of current by allowing more to come in from the alternating current mains rather than to use a wide open, spluttering spark gap as thereby a faradic character may be imparted to the diathermy which would not only be more disagreeable to the patient, and less current could be used, but it would also act as a stimulating diathermy rather than as a sedative one.

TIME OF TREATMENT

This cannot be exactly interpreted in minutes as the result and the reaction are the main factors. . In general it takes at least 20 minutes to heat thoroughly a part. With the double cuff method the treatment should be continued until the skin between the inner edges of the electrodes becomes hot. This may take from 20 to 60 minutes.

FREQUENCY OF TREATMENT

This depends on the underlying pathology. For the relief of pain, or in a pneumonia, one or two treatments a day may be necessary. In non-union or delayed union of bone, two or three times a week will suffice.

SPECIAL TECHNIC FOR JOINTS

1. Toes and fingers. Here a combined cuff and water bath is best. For the toes the foot is plunged in a basin with just enough water to cover half the depth of the foot, and a metal cuff is affixed two inches above the ankle; or if allowing the leg to hang down causes pain or throbbing, the patient may lie on a table with his feet hanging over the edge with the tips of his toes inserted in the water. Of course, one cord from the high frequency machine is inserted in the water, care being taken not to allow it to come in contact with the skin. In a similar way the finger or fingers are inserted into the water bath (a glass candy jar makes a convenient receptacle) and a metal cuff applied approximately two inches above the wrist—400 to 600 milliamperes.—

2. Ankle and wrist. Double cuff is the best. One cuff should be firmly bound around the toes or fingers, and if the parts are well lathered, there should be no prickling The other cuff should be placed two to four inches above the joints,—400 to 800 milliamperes.

3. Knee. As a rule the lateral method is more efficacious. Care should be taken to so center the electrodes that "skin effects" may be avoided. The electrodes should be of oval shape and dependent on the size of the knees, should have an area of from 8 to 12 square inches each.—600 to 900 milliamperes.

4. Hip. The antero-posterior method is the best. An oval electrode, four by six inches (24 square inches) is placed anteriorly over the groin with its center over Poupart's ligament, while posteriorly and diametrically opposite an oval electrode 5 by 7 inches is inserted under the patient. A sandbag will hold the anterior electrode securely—800 to 1,000 milliamperes.

5. Spine. Two methods are available, the antero-posterior and the longitudinal. The latter has greater skin effects and really heats the spine by conduction. For this method, two metal electrodes are placed, one 4 by 3 inches over the cervical region, the other 5 by 7 inches over the sacrum. If the patient rests upon pillows, good contact is assured, though if it is desired the electrodes may be affixed with adhesive plaster—800 to 1,000 milliamperes.

ANTERO-POSTERIOR METHOD

a. Cervical region. Place a 2 by 6 electrode over the cervical spine, the patient preferably lying on his back; hold by means of a sand bag a 5 by 7 electrode over the chest—700 to 900 milliamperes.

b. Thoracic and lumbar region. Use a 2 by 10 inch electrode posteriorly and a 10 by 12 anteriorly. This can be readily held on the abdomen by a standbag, the patient of course being recumbent, —800 to 1,200 milliamperes.

6. Shoulder. The shoulder joint is notoriously hard from a diathermic standpoint. Many mechanical devices have been offered to hold the electrodes in position. With any rigid support, though, there is danger of undue pressure. It is hard to bind on small metal electrodes. So far the only solution I have found is by the use of metal mesh spread over a rubber sponge. This type of electrode can be readily bound over the joint, and the resiliency of the rubber will prevent undue pressure. The sponge should be moistened, otherwise, due to the heat there will be a burnt rubber smell—600 to 800 milliamperes.

7. Elbow. With the elbow the double cuff method is best. Two cuffs, one, two inches above, the other two inches below, the elbow will in a short time thoroughly heat the joint,—400 to 800 milliamperes.

It is useless to wrap chain mesh around the joint and expect any heating of the joint. That this is so, may readily be proved by taking a piece of meat, encircling each end with a cuff and turning on sufficient current to cook the meat. Under the cuff the meat will be found cold and uncooked, while between the inner edges of both cuffs the meat will be steaming hot and well cooked.

OTHER SPECIAL APPLICATIONS OF DIATHERMY

1. Sinuses.

a. Frontal. Bind on by an elastic bandage or rubber band, over the region of the sinus, a 2 by 4 electrode, first lathering the skin. Similarly apply a 4 by 6 electrode to the cervical region. If possible have the patient recumbent, otherwise bind it securely by a bandage. The only difficulty of this is the choking sensation which may ensue. —300 to 500 milliamperes.

b. Antrum. Employ the lateral method by holding or binding a 4 by 5 electrode over the unaffected side of the face, and a circular two inch in diameter electrode in a wooden handle held firmly over the antrum,—200 to 400 milliamperes.

2. Brain. Treat as in frontal sinus. Recurrent bleeding as in certain types of hemiplegia is a contra indication,—300 to 500 milliamperes.

3. Eyes. Use a curved double eye non-vacuum electrode over the eyes with a 4 by 6 electrode over the cervical region as in frontal sinus. With the curved type of non-vacuum electrode, the patient can readily lie down and hold the electrode with comfort.

4. Middle Ear. Bind a cuff on each wrist. Have the patient insert his little finger in the external auditory canal, giving as much current as the patient can stand without effort. If it is impossible to regulate the strength of the current finely enough, have the patient touch his face with one or more of the other fingers, thus using the fingers as a rheostat,—100 to 600 milliamperes.

5. Kidney. Use a 4 by 5 oval electrode posteriorly over the kidney, patient preferably recumbent, with a 8 by 10 electrode anteriorly, held by a sandbag or hot water bottle over the abdomen,—600 to 1,000 milliamperes.

6. Spastic Gut. Frequently in treating cases of constipation, one portion of the colon usually in the vicinity of the sigmoid will be found to be spastic. This can be relieved by diathermy. Technic. Cut an electrode large enough to cover the spastic area anteriorly, and place over the lumbar region an indifferent electrode approximately twice as large. Patient recumbent,—600 to 1,000 milliamperes.

7. Coccyx. In coccygodynia diathermy will often afford prompt and lasting relief. Cut out an electrode the size and shape of the coccyx with a flange projecting either to the right or left depending on the location of the referred pain. Have the patient lie on his belly, insert a curved insulated rectal electrode so turned that the metal end will come in contact with the coccyx internally, and mould over the coccyx externally the specially prepared electrode. Hold it in place by a sandbag,—300 to 800 milliamperes.

8. Chest. For pneumonia, bronchitis, asthma, and angina, diathermy may be of value. I have never found any bad effects on the heart with this procedure. 6 by 9 electrodes should be placed anteriorly and posteriorly, the posterior one more to the left, the anterior one more to the right. 1,000 to 1,800 milliamperes may be safely used. It is well to turn the current on gradually, taking 3 to 4 minutes before attaining the maximum strength. The anterior electrode may be held on by a sandbag, hot water bottle, the hand of the operator, or adhesive plaster. The duration of the treatment should be at least 30 minutes.

I have some hesitancy in mentioning milliamperage, for there are such things as high speed meters. I have tested meters which registered twice the amount that my other meters did under exactly the same conditions. Until we can secure standardization, it will be necessary for each physician to work out his own standard for his own particular machine or machines.

Not infrequently it is possible to treat two joints at once, such as both knees, shoulders, hips. For this purpose there is necessary either a bifurcated cord, or a multiple cord connector. It is not advisable to treat two dissimilar joints at the same time, such as knee and elbow, as the current strength will vary owing to differing degrees of resistance. It is also necessary to take care that the conducting cord (rheophore) or the metal parts of the connector be well insulated from the patient. Dry absorbent cotton or a towel will suffice.

There are many types of connectors. The two I use most are, first, the safety pin, and second the Morse Eureka clip. Some have complained that the latter, the clip, will release its hold when the weight of the patient's body is put upon it. I have not had this experience.

SPECIAL INDICATIONS FOR DIATHERMY

1. Non-union or delayed union of bone. Here diathermy, where a fair degree of fixation of bone can be secured, is of value. Wherever possible the lateral method is used. If apparatus can not be removed, the cuff method is best. Frequently if the part is encased in a plaster cast, windows can be cut in the cast anteriorly and posteriorly, one a little below and the other a little above the break. Through these windows can be inserted the metal electrodes and a fair lateral treatment can be given. I have never seen any harm result from the so-called swelling of the parts treated. 400 to 700 milliamperes every two or three days is usually often enough. In some cases, bone grafts first, and diathermy following seems to shorten disability.

2. Bursitis, especially subdeltoid with calcification. Whether calcified bursae disappear spontaneously, I know not, but at all events under diathermy and chlorine ionization through the shoulder followed by massage and gentle manipulation, they are doing it now.

3. Hyperthrophic arthritis. Here, provided overgrowth of bone is not a mechanical obstruction, and even though the X-Ray picture remains unchanged, prompt symtomatic relief is usually obtained by diathermy and ionization. Numerous cases physically incapacitated are returned to gainful occupations for periods of many months. A relapse occuring, relatively fewer treatments will send them on their way rejoicing, for the time symptomatically cured.

4. Pneumonia. An internal poultice such as is afforded by diathermy, the increased local temperature (nature's method), the increased hyperemia and drainage, and the augmented phagocytosis all seem to mark the use of diathermy as a rational procedure. Often the improvement in the pulse, disappearance of cyanosis, and the decrease of pain, is coincident with the treatment. The technic has been given above. Treatments may be given twice daily.

5. Bronchitis. Lately I have treated several cases of chronic bronchitis with cough, by means of diathermy and air-cooled ultra violet. So far the results have been very satisfactory, but many more cases must be thus treated before we have any right to make any claim for this procedure.

6. Asthma. So called essential asthma is in the same category as bronchitis, both as to technic of treatment and claims as to results: only it would seem rational to expect that the relaxing effects of diathermy ought to relieve the muscular spasm.

7. Neuritis. Frequently a very acute neuritis will be more quickly relieved as regards pain, by diathermy than by any other method. The double cuff technic is usually employed. In brachial neuritis, not infrequently the cervical and upper thoracic spine is affected, hence in such cases I employ the following technic: Suppose it is the right arm—place a semicircular strip of metal over the left side of the spine, and a cuff over the upper arm. Diathermatize until the shoulder is hot. 600 to 900 milliamperes. Remove the cuff from the upper arm and place it around the wrist continuing until the whole arm is hot. The first treatment will often cause increased pain, but this apparently is not a bad sign.

8. Spasticity. This is best treated by diathermatizing the appropriate centers in the spine, and then by the double cuff method, heating the spastic muscles.

9. Osteomyelitis, chronic. Here again, a combination of the double cuff method of diathermy and general and local air-cooled ultra violet is of value.

10. Pain. Local pain is frequently ameliorated by diathermy.

Contra-indications to diathermy. There are two such contra-indications.

1. Pus without drainage.

2. Lesions where there is likelihood of hemorrhage.

This latter includes pulmonary tuberculosis, ulcers of stomach and viscera, and recurrent hemorrhage in the brain.

Compliments of

THE LIEBEL-FLARSHEIM CO.

410-416 Home Street

Cincinnati, Ohio

Printed in U. S. A.

Directions for using

FISCHER'S COLOR SCALE

for D'Arsonval Currents

Insert a 60 watt 110 volt carbon lamp in circuit between patient and coil.

To obtain amount of current given to patient, match color of lamp with shades below, and figures thereon indicate same in milliamperes.

Removal of lamp, or direct connection, increases current given to patient 20%.

800 M-A.

700 M-A.

600 M-A.

450 M-A.

350 M-A.

250 M-A.

Installing and Operating Instructions

for the

FISCHER PORTABLE DIATHERMY APPARATUS

Types "G2" and "GP2"

DETAIL EXPLANATION OF PANEL DIAGRAM

No. 1—This terminal, forming one outlet for all of the bi-polar diathermy circuits, must always be used with one of the other outlets, No. 2 for high voltage, No. 3 for medium voltage or No. 4 for low voltage, and if desired, with the highest voltage pole No. 7. No. 1 is not used in connection with No. 7 when the latter is to be used for monopolar discharge for high frequency glass vacuum and non-vacuum electrodes, monopolar desiccation, fulguration, etc.

No. 2—Terminals Nos. 2, 3, 4 and 7 are merely different taps taken from the high voltage generating source in the cabinet, and before applying diathermy current the operator should estimate the type of current desired as compared to the resistance of the part to be treated, and use either of the four outlets in connection with No. 1 as desired. No. 2 when used in connection with No. 1 completes the highest voltage diathermy current available from the Type "G2" Cabinet. This current is mainly used for medical diathermy treatments where the resistance of the part is rather high, or for autocondensation purposes. The voltage across terminals Nos. 1 and 2 in combination is about 50% higher than across terminals Nos. 1 and 3.

It will be found on test that while more current may be obtained under certain conditions when using terminals Nos. 1 and 2, that were these conditions changed other combinations will be found superior.

No. 3—Outlets Nos. 1 and 3 provide a medium voltage diathermy current. This current will be found suitable for certain electrocoagulation purposes, that is, where the voltage across terminals Nos. 1 and 4 is not sufficient to overcome the resistance at the point of operation, and for the majority of the medical diathermy applications. The voltage across terminals Nos. 1 and 3 is approximately 50% greater than across terminals Nos. 1 and 4.

No. 4—Outlets Nos. 1 and 4 provide the lowest voltage diathermy currents available. This current is mainly used for electrocoagulation (surgical diathermy) purposes, and for medical diathermy applications where the resistance of the part being treated is low.

No. 5—The milliampere meter is provided with two distinct windings, with an indicating scale for each, that the smaller current discharges may be read with just as much accuracy as the heavier loads. Always make sure that the meter selector control No. 7 is on the 1,000 mark for reading currents under 900 M. A. and then read the lower scale on the meter to correspond. Set indicator on the 4,000 mark when reading heavier currents, and read the upper scale to correspond. Were this meter provided only with a 4,000 M. A. scale, you would find it next to impossible to get accurate readings under 1,000 M. A., hence the double-scale.

No. 6 — The selector switch is used in connection with the double-scale on meter No. 5. For the reading of heavy currents (anything over 900 milliamperes), set the indicator to the 4,000 mark and read the upper meter scale. For accurate readings of currents under 900 milliamperes, set the indicator to the 1,000 mark and read the lower scale on the meter. Were a one-scale meter provided, the operator would experience considerable difficulty in making accurate readings of any and all currents used, whereas with the double scale accurate readings are possible during all treatments.

No. 7 — This terminal may be used either for unipolar, very high voltage low milliamperage applications (monopolar desiccation, for exciting glass vacuum and non-vacuum electrodes and fulguration), or may be used in conjunction with the terminal No. 1 for the bipolar discharge. The voltage here is exceedingly high, but the milliamperage available is correspondingly low. There are many well known operators who prefer exceedingly high voltage for certain applications for both unipolar and bipolar use.

No. 8 — The multiple spark gap is provided with 8 electrically welded tungsten tips, and is constructed with extremely heavy radiating facilities, thus insuring two things: a constancy of current output at any voltage or milliamperage, and the elimination of over-heating.

The spark points may be adjusted individually by means of the small control knobs toward the back, or collectively by using the large master control knob to the front. Careful adjustment of this gap, and due consideration given to the auto control selector No. 10 will insure an even, resonant discharge of diathermy or high frequency current for any purpose. The operator may either adjust both controls Nos. 8 and 10, each in conformity with the other, to obtain true resonance of output, or, afer you have mastered the machine you may set No. 10 to the point where you know the current desired can be obtained for the treatment at hand, and make your minimum to maximum adjustment with No. 8, entirely.

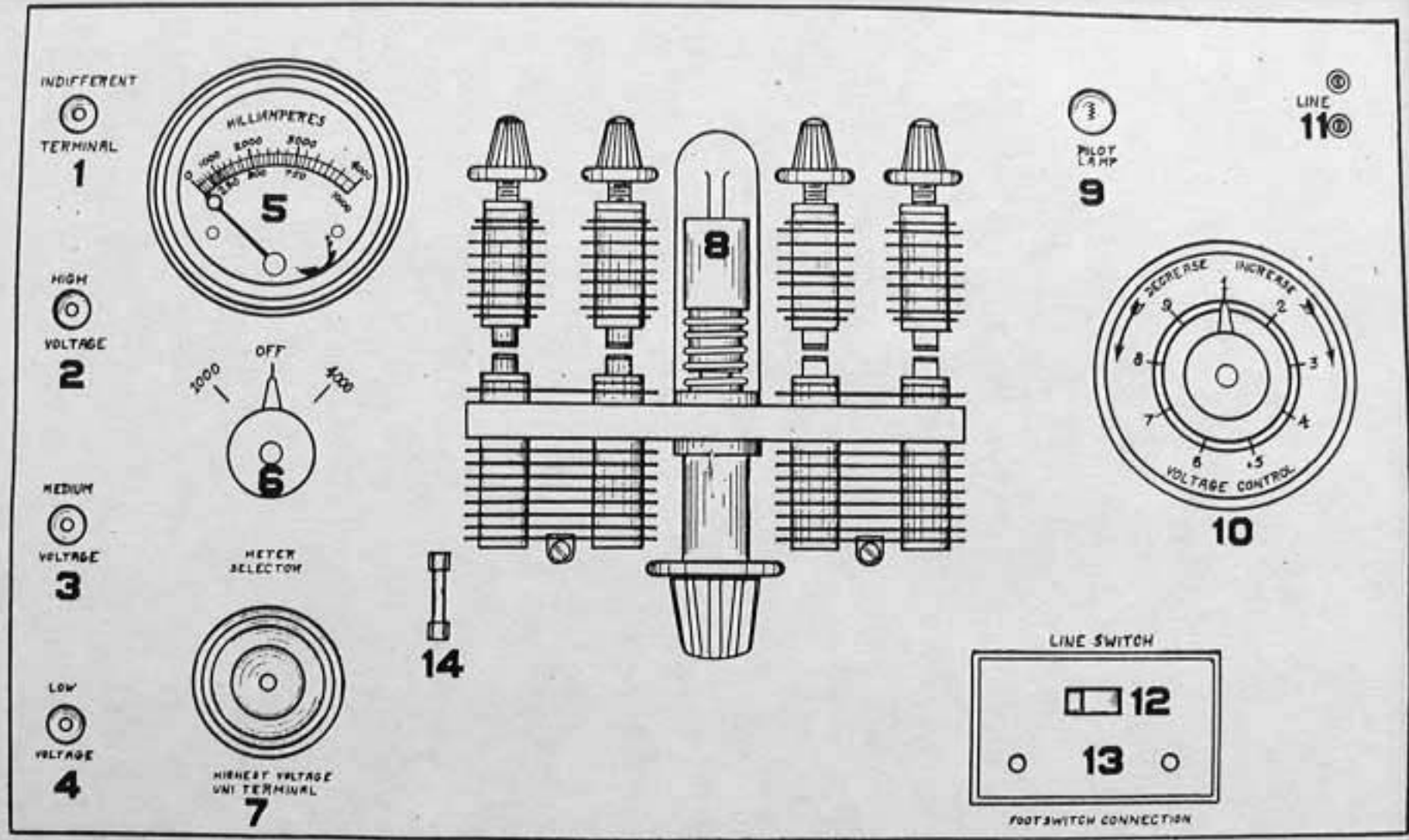
The spark interrupter gap is the most important regulating feature on any high frequency generator. Its function is to regulate the discharge of the high tension current in connection with control No. 10, and may be adjusted either with the current on or off. When the tungsten spark interrupter tips are closed, there is a direct short circuit on the transformer, and no discharge from any of the high tension outlets.

As these spark interrupter points are gradually separated, the high tension current passing across the gap produces an oscillating or vibratory effect (evidenced by sparking) which is increased up to that point where the voltage is insufficient and the sparking ceases. The highest rate of oscillations — that is, the highest frequency of discharge — is obtained with the spark interrupter points nearly closed. At this point, also, is obtained the very smoothest flow of current.

More milliamperage is obtained by separating the spark interrupter points. Should you separate these points so far that the sparking ceases, simply bring the points closer together and the sparking will be resumed.

The current discharge across the spark interrupter points ceases when the voltage is insufficient to carry across. Voltage is increased with control No. 10

An individual pair of points, only, may be employed for the very lightest currents, or two pairs, or any number, if properly adjusted. It is inadvisable to have one pair of points widely separated, while the others are adjusted close together. For the best, most uniform discharge, we recommend using all points uniformly adjusted, wherever possible.


INDIFFERENT
TERMINAL
1
HIGH
VOLTAGE
2
MEDIUM
VOLTAGE
3
LOW
VOLTAGE
4
MILLIAMPERES
5
OFF
1000
4000
6
METER
SELECTOR
HIGHEST VOLTAGE
UNI TERMINAL
7
8
14
PILOT
LAMP
9
LINE
11
DECREASE
INCREASE
VOLTAGE CONTROL
10
LINE SWITCH
12
13
FOOTSWITCH CONNECTION

The sparking points are made of pure electrically welded tungsten — the hardest and most durable material available for this purpose. They need no attention whatever. They will not pit, become corroded, or with just ordinary care need any adjusting. The proper setting of the movable spark points is such that the tip extending from the bearing is practically the same length as the stationary tip on the opposite side.

Wipe gap occasionally with a dry cloth. Dust forms a conductor, and must be removed.

No. 9 — The pilot lamp is used to indicate the fact that current is passing through the transformer. When the current is cut off, the light goes out, and with the current on, the lamp will illuminate with a red glow. This is merely an additional safety measure, as a glance at the cabinet will indicate whether the current is on, regardless of the position of the buttons on the line switch No. 12.

No. 10 — This is the main controller for the 9-step auto transformer. Point No. 1 is the setting for the weakest output, and turning the pointer to the right increases the discharge up to maximum at point 9. You will find that the adjustment is very positive, that is, there is a very decided click as contact is made on any one of the points, and that while you can pass from maximum to minimum (from point 9 to point 1), it is impossible to turn backward from 1 to 9. This is done because a big drop in current from maximum to minimum will do no appreciable damage, whereas a sudden increase (a turn backward from 1 to 9) might be a dangerous procedure. This forms the main control for the primary current entering the transformer, whereas the spark gap No. 8 controls the volume of the secondary current after it leaves the transformer. For best results, therefore, it is quite advisable to adjust one somewhat proportionately with the other, to insure a resonant discharge.

No. 11 — Line connection. Always be very sure that the line connecting cord is placed into a lamp socket on an alternating current line of the proper voltage and cycle as indicated on the nameplate, or if direct current only is available, be sure that the output of your rotary converter is exactly the same as indicated on this nameplate.

No. 12 — The main line switch controls the alternating current entering the cabinet. When the white button is down, the current is on, that is, the switch is closed. When the black button is down, the current is cut off. This switch is made with the contact bars fully twice the required size for an apparatus of this nature, and this extra material is merely furnished to insure long life.

No. 13 — A foot switch is an absolute necessity when performing electrocoagulation operations, and for certain other diathermy and high frequency work. The foot switch terminals are placed in the outlets No. 13, and the circuit is closed by pressing on the foot plate instead of closing switch No. 12. Switch No. 12 is left in the "off" position when the foot switch is employed.

No. 14 — This fuse offers protection to the milliampere meter should you accidentally, or otherwise, pass too heavy a current through with the wrong setting of selector No. 6, or by possibly touching your electrodes or cord tips together. This fuse will blow out when approximately 1,500 milliamperes are reached with the lower scale (1,000 M. A.) adjustment. Inside the cabinet a coil is connected across this fuse circuit which carries the current after the fuse is blown, preventing the peak voltage from rising to a

dangerous point and giving the patient a momentary shock, and keeps the current output within safe limits through the meter. While the fuse will glow to a dull red heat when the 1,000 milliampere point is reached on the lower scale, and 4,000 M. A. on the upper scale, it will not blow out under a 50% overload.

Medical Diathermy

is obtained as follows: Set the indicator on the auto transformer control No. 10 on one of the lower settings (2, 3 or 4). Close the spark interrupter points No. 8 (these points should come together evenly). The rubber-covered connecting cords are used to make connections from the diathermy electrodes, which electrodes are selected to suit the individual case, to either outlets 1 and 2, 1 and 3 or 1 and 4, depending on the current output desired.

All tissue offers some resistance to the discharge of the diathermy current, and the greater the resistance the greater the voltage that must be employed to overcome it. Hence, outlets 1 and 4 will be suitable for very light work, 1 and 3 when the part to be treated is not very heavy, or the electrodes placed not too far apart, and 1 and 2 outlets for the heavier parts of the body.

For the initial test, we suggest placing one cord tip into outlet 1, and the other into outlet 3. The other ends of the cords are slipped in the electrode clips, which in turn are fastened to the selected electrodes; we will substitute a bowl of salt water for the patient. Cut off two small pieces of sheet block tin electrode material, and attach them to the cords with the clips (catalog No. 868). Place these two pieces of metal into a bowl of brine, and see that they do not come closer than one inch one to the other. Close the line switch No. 12 and gradually open the spark interrupter points No. 8 until the meter needle shows movement. As the spark points are separated, the milliampere reading will increase. Advance controller No. 10 another point, and further separate the spark points. Decrease and increase the volume of curernt generated by altering both of these controllers Nos. 8 and 10, until you become thoroughly familiar with the controlling procedure. It would be well to try this a number of times with different sizes of electrodes, by using stronger and weaker brine solutions, that is, with lesser and greater resistances, until you become thoroughly familiar as to how much each individual maneuver affects the current output.

Now try outlets 1 and 2 in combination, and you will find that as you decrease and increase the resistances of the water medium and try various settings of the auto control No. 10, and bring together and separate the points on the spark gap, the readings will be quite different as compared to the amount of current generated when employing outlets 1 and 3.

Then try outlets Nos. 1 and 4 in combination, and you will find the results again quite different as compared to 1 and 3 and 1 and 2. It is inadvisable to apply the electrodes to the patient until you have become thoroughly familiar with the apparatus, have studied the instruction book, "Diathermy Therapy," or have had suitable instructions from one who knows the apparatus.

When making the above tests, be sure that your meter selector switch No. 6 is set to the 4,000 point. Then, after you have made a few tests and wish to try out lower milliamperage readings, you may set the indicator to point 1,000.

To Obtain Electrocoagulation (Surgical Diathermy) Current

Set the indicator on the auto transformer control No. 10 on one of the lower settings (2, 3 or 4). Close the spark interrupter points No. 8 (these points should come together evenly). The rubber-covered connecting cords are used to make connections from the diathermy electrodes which electrodes are selected to suit the individual case, to outlets 1 and 4.

Here, again, the item of tissue resistance must be taken into consideration, and the voltage outlets selected to suit the individual operator. Ordinarily terminals 1 and 4 supply the proper voltage, although 1 and 3 at a slightly higher potential, may be required for some work. The voltage as supplied from outlets 1 and 2 is rarely necessary for surgical procedure.

It is customary when speaking of electrocoagulation technic to refer to the *active* and *indifferent* electrodes; the active electrode being the small point or disc which is placed in direct contact with the diseased tissue, and the latter (the indifferent electrode), the larger metallic plate to cover a great deal of skin surface to prevent heating sufficient to destroy healthy tissue, is placed preferably on the opposite side of the body or at least adjacent to the point of operation.

A piece of raw beef on a flat plate of block tin will best serve as the patient for the preliminary test. Grasp the insulated handle of the active coagulation electrode No. 862 at least 2 inches away from the metal end and preferably with the flexible connecting cord passing over the back of the hand. A foot switch should be employed for this work. Stepping on the foot switch closes the circuit; or if the foot switch is not employed, close line switch No. 12. Open the spark interrupter points slightly, bring the point of the active electrode down to the meat, and you will observe sparks from the point of contact and some small reading on the milliampere meter. Never fail to have meter selector indicator No. 6 either on "off" or 4,000 positions; never on the 1,000 point, as surgical work calls for very heavy current discharges, and if you leave this selector connected to the wrong scale, you are liable to burn out the meter.

Press the needle-point electrode into the meat to different depths; increase and decrease the current by adjusting the spark interrupter points, and vary the voltage with the controller No. 10. Observe how the milliamperage will vary with these different settings. Now hold the electrode away from the meat a short distance, to cause sparking. You will find after making a series of these tests that you can produce varied depths of desiccation, coagulation and blanching at will. It is absolutely necessary that a series of experiments along this line be made, that you may thoroughly familiarize yourself with the current action before trying applications on living tissue. When once fully conversant with the apparatus, the required currents for various degrees of coagulation, etc., we suggest that meter selector switch indicator remain at the "off" point; that is, the meter cut out of the circuit entirely, as then should you accidentally touch your electrodes one to the other, your meter would not be damaged.

To Obtain D'Arsonval Autocondensation Current

Have the current control indicator No. 10 set on point 5. Place selector No. 6 on the 1,000 mark, as autocondensation treatment readings rarely exceed 800 milliamperes. Close the spark interrupter points No. 8. The autocondensation pad is connected by means of one of the rubber-covered cables to outlet No. 2. The patient should recline comfortably on this pad, and either no pillow employed or one that is quite thin, the object being to keep

the patient's entire body, even the head, as close to the pad as possible. Connect other rubber-covered cable from outlet No. 1 to the long nickel-plated handle, which handle should be held firmly in the patient's two hands. Always place a heavy folded towel or other similar insulating medium between the body and the hands, to prevent any possible leakage from the handle to the body. Some operators prefer employing an electrode of block tin placed either on the abdomen or chest instead of this No. 81 handle, and the technic is a matter of choice. Close switch No. 12 and gradually open the spark interrupter points No. 8 until a smooth flow of current is obtained, but never so far that the discharge becomes noisy or uneven in character.

The current volume is increased and decreased by means of the auto transformer control No. 10, as well as the spark interrupter points. The distance between these points should be adjusted equally. Now have the patient rise up slightly with the current on, and observe how the reading on the milliampere meter varies as the body moves away from the pad, that is away from the charged field. This is simply to prove to you that for maximum current effect the patient must remain close to the pad.

Indirect Diathermy

This is the title given by certain operators to a slight modification of the autocondensation treatment, that is, where the indifferent electrode is the autocondensation pad and the active electrode a plate of block tin.

Unipolar High Frequency Application

Set the indicator No. 10 on any one of the lower settings (2, 3, or 4), and close the spark interrupter gap No. 8. Connect the heavy insulated cable No. 83 to terminal No. 7, and to the high frequency handle. A glass electrode, either vacuum or non-vacuum type, should be held firmly in the handle clamp. As the milliampere meter No. 5 is not used in connection with this unipolar discharge, the setting of meter selector No. 6 is immaterial. Close switch No. 12 and gradually open the spark interrupter points, and increase the voltage by means of controller No. 10 until the desired amount of current is obtained through the bulb.

Indirect High Frequency Applications

are obtained from the same current as used for exciting the glass electrodes, directly from uniterminal No. 7, but the application is reversed. Instead of connecting the heavy cord No. 83 from uniterminal No. 7 to the high frequency handle or to the electrode direct, the current is sent through the patient by means of the metal handle No. 81. The patient grasps the No. 81 handle firmly (which is directly connected with the heavy cord to terminal No. 7), the current is turned on and regulated as for high frequency, and the discharge is withdrawn from the body with the operator's fingers at the point desired.

Desiccation

has been referred to in the past as "fulguration," and refers to a dehydrating process similar to a minor application of electrocoagulation current. The discharge is monopolar (the bipolar technic is referred to as electrocoagulation). The current is taken from the uniterminal No. 7 and is regulated by means of controller No. 10 and spark gap No. 8. This current is not measured by the milliampere meter; hence the setting of indicator No. 6 is immaterial.

Indirect Desiccation

or as it has formerly been referred to "indirect fulguration," is obtained in exactly the same manner as the indirect high frequency discharge, only

instead of the fingers withdrawing the current in a mild manner at the spot desired, a pointed electrode of metal is employed. This electrode must not be insulated, but the bare metal is held in the operator's fingers. The current may be extracted from the patient from a very limited area, and the effect may be one of extreme heat or merely sparking, at the will of the operator. Sufficient current to desiccate or to dehydrate only, is employed. The setting of the spark gap No. 8 is very important in this treatment, to avoid passing too much current.

Foot Switch

For all electrocoagulation work, and in many instances for medical diathermy applications, a foot switch is quite necessary. The metal ends on the foot switch connecting cable are plugged into the two openings protected with rubber bushings on the left side of the cabinet. When the foot switch is pressed, it closes the circuit in place of line switch No. 12. You may leave the foot switch connected to the cabinet at all times and simply use the line switch as desired, pulling out the foot switch from under the cabinet when you wish to use it.

CAUTIONS

Always be sure that line switch No. 12 is open, and that pilot light No. 9 is out before leaving the cabinet.

Always observe the setting of voltage control No. 10 before turning current through patient. Treatments should start with a minimum discharge and be increased gradually to maximum.

Always observe the position of the spark interrupter points on gap No. 8 before closing the circuit to the patient. These points should be closed, or nearly closed, before the current is turned on, and opened gradually to the desired milliamperage.

Do not permit electrodes or cord tips to touch one another with the current on. This creates a dead short circuit, and will undoubtedly burn out your milliampere meter.

Glass electrodes often crack after a treatment when laid against a cold surface. Bursting is caused from sudden shrinking at the point of contact.

Dust your spark gap frequently. Dust forms a partial conductor and must be removed. Clean metal surfaces on all parts of the gap radiate heat much more readily than dirty ones. Keep the gap clean.

Never leave your machine for a long period with the current on. If the outfit is not to be used for some hours, as for instance over night, the safest procedure is to cut off the current where your connecting cable is attached to the line wiring.

Never connect this apparatus to any other line current than that plainly indicated on the nameplate.

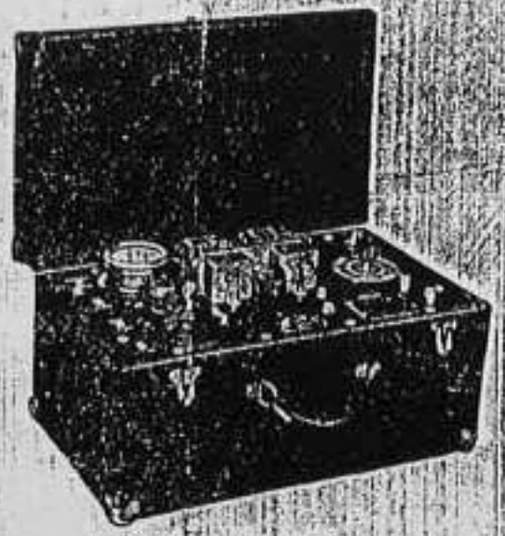
Now, last but by no means least, read the book on operating technic, or as we term it, "Diathermy Therapy" form No. 535, from cover to cover. It was written for you, Doctor, and the contents were carefully checked over. It should prove of valuable assistance to you.

H. G. FISCHER & CO., INC.,
Physiotherapy Headquarters,
2323-37 Wabansia Avenue,
Chicago, Illinois

Form 946A

Printed in U. S. A.

The Fischer Physician's Portable Diathermy Unit



Catalog No. 1393

This unit is built into a black leatherette covered carrying case, with closed
aking it in every sense a "portable" apparatus. While this is a very effec-
dfice machine, it is more especially adapted to bedside work.

The same electrical units are incorporated in this portable as in the walnut
and the same descriptive matter applies.

Catalog No. 1393—The Fischer Type "GP2" Portable Diathermy Unit,
ack carrying case, with connecting cord and plug only, wound for opera-
on the 110 Volt 60 Cycle A. C. line. Code, VITTAT—$285.00.

Rotary Converters

Where the Direct Current only is available, a Rotary Converter, to trans-
the direct current flow into the necessary 110 Volts 60 Cycles Alternating
be employed. The Fischer Diathermy Units cannot be operated on Direct
ent without a Rotary Converter.

When ordering a Direct Current machine specify so carefully and add

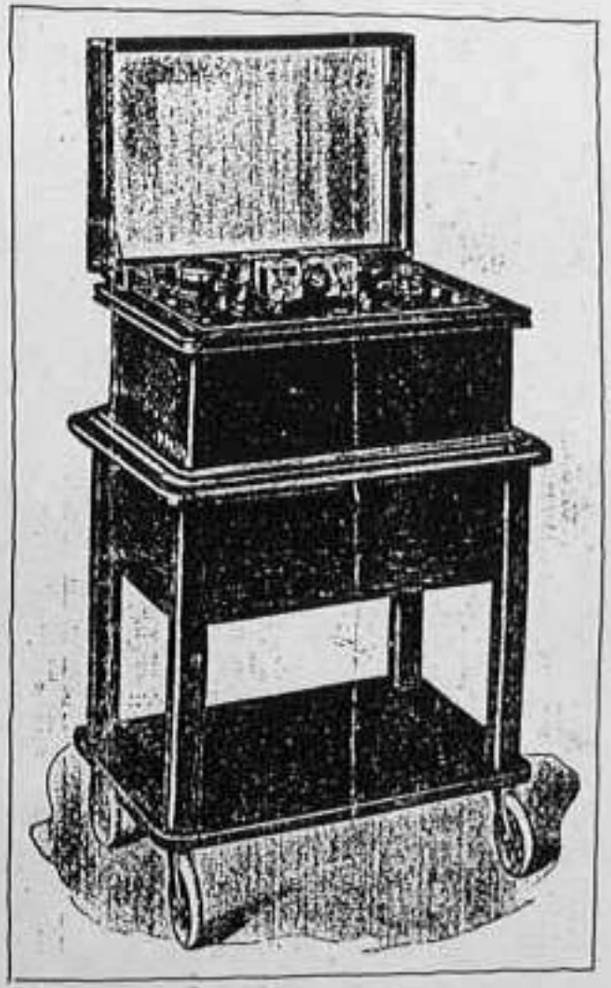
log No. 954—Rotary Converter, with Protecting Condenser,
code ENPORG—price $85.00.

for operation on the 110 Volt D. C. Line.

or

log No. 959—Rotary Converter, with Condenser, code ENPOGS—
rice $85.00.

The FISCHER PORTABLE DIATHERMY *and* ELECTROCOAGULATION APPARATUS



Manufactured by

H. G. FISCHER & CO., INC.

Physical Therapy Headquarters

J. H. SMALL
PHILADELPHIA OFFICE
1700 Walnut Street, 10th Floor
Pennypacker 8237

edical Diathermy ∽ Surgical Diathermy ∽ Electrocoagulation
Auto-Condensation ∽ High Frequency

The methods of choice of those who have investigated!

No physician's office, no hospital or sanitarium is complete without some good Physiotherapy equipment—particularly a Diathermy apparatus of the portable or semi-portable type. Such a machine is a decided requisite if modern methods of medicine and surgery are to be employed.

Often the case to be treated by Diathermy is one that cannot well be moved to the Physician's office, or to the Physiotherapy ward in the hospital. To meet such contingencies, two types of Portable Diathermy Outfits have been designed and perfected; one for hospital use, the other for use at the patient's home. Both are described in this pamphlet.

In either of these portable outfits, every needed modality is instantly available. Small and light, they are nevertheless powerful and durable. Suitable for Medical Diathermy, Surgical Diathermy, Electrocoagulation, Auto-condensation, High Frequency; embodying plenty of power and range, accurate and easy to operate, and capable of excellent results.



Catalog No. 1390

The Fischer Hospital Portable Diathermy Unit

This unit is built into a handsome solid walnut case, with glass top. Designed especially for the operating room or at the bedside. Equally valuable for both medical and surgical work. The Hospital Unit embodies all that is desirable in an apparatus for the purposes intended:—

Efficiency—4000 milliamperes available.
Range—9 voltages, for Medical Diathermy, Surgical Diathermy, Auto-condensation and High Frequency.
Control—Auto-transformer, Multiple Spark Gap.
Accurate Meter—Double scale, with 0-1000 and 0-4000 M. A. readings, and cut-out. Meter removable without disturbing wiring.
Perfect Insulation—Air-cooled; no oil, no wax.
Multiple Spark Gap—8 Tungsten tips.
Foot Switch Attachment—a necessity when operating.
Light Weight—truly Portable—only 50 pounds.
Pilot Light—a Safety Device.
Neat Appearance—harmonizes with any surroundings.
Small Size—measures but 12" x 14" x 22".

There is no better unit available of a portable type. It must be seen and operated to be appreciated. The latest technic advocated by our most able Physiotherapists may be employed with this apparatus with assurance of splendid success. The usual liberal Fischer Guarantee accompanies each apparatus.

Catalog No. 1390—The Fischer Type "G2" Hospital Portable Diathermy Unit, in solid walnut case with glass top, with connecting cord and plug only, wound for 110 volts 60 Cycles A. C., code VITRIC—$305.00.

Catalog No. 1389—The Fischer Type "G2" Diathermy Unit in solid walnut case with glass top, mounted on mobile Hospital Cart, as illustrated on cover, with connecting cord and plug only (*no accessories*) for operation on 110 Volt 60 Cycle A. C., code VITART—$345.00.

Unless otherwise specified these outfits will be furnished to operate on the *110 Volt 60 Cycle Alternating Current Line*. Where the Alternating Current available is other than the 110-60, add:—

For 110 Volts 25 Cycles.....add $15.00
For 110 Volts 40 Cycles.....add 12.00

Explanation of Diagram on Opposite Page

1—This terminal forms one outlet for all three diathermy circuits, and must always be used with one of the other three (low voltage, medium voltage, high voltage) diathermy outlets.

2—Highest voltage diathermy terminal. To complete circuit to patient use outlets Nos. 1 and 2.

3—Medium voltage terminal. To complete medium voltage circuit to patient use outlets Nos. 1 and 3.

4—Lowest voltage terminal. To complete circuit to patient use outlets Nos. 1 and 4.

5—Double scale milliampere meter: 0 to 1000 M. A. lower scale to be used for measuring small amounts of current, and the 0 to 4000 M. A. scale for the heavier discharges. (See paragraph on "Meter" for further information.)

6—Control plate for meter No. 5. For reading of current discharge up to 1000 M. A. set indicator on 1000. Set indicator on 4000 for reading heavier currents. Be cautious when using lower scale, as should your cords or electrodes touch one another and create a short circuit, the meter is apt to burn out. The outfit may be operated without the meter by placing the indicator on "off" point.

7—High tension high frequency Tesla pole for uni-polar discharge only. Not to be used in connection with any other outlet.

8—Multiple Spark Gap. Tungsten points may be adjusted individually by means of small black knobs, or simultaneously with the large black master knob. One, two, three or four sets may be used, depending on the current output desired, although adjusting all points equal distances apart gives more uniform, satisfactory results.

9—Pilot lamp. Indicates current on or off.

10—Main controller. For weakest current discharge set indicator on point 1. Increase volume by turning indicator to right; point 9 being maximum.

11—Line connection. Port of entry for 110 volt, 60 cycle alternating current, or as indicated on nameplate.

12—Main switch. Button to right, and white dot showing, current ON. Button to left, current OFF.

13—Terminal outlets for foot switch. When using foot switch leave main switch No. 12 in the OFF position.

14—Protecting fuse for milliampere meter.

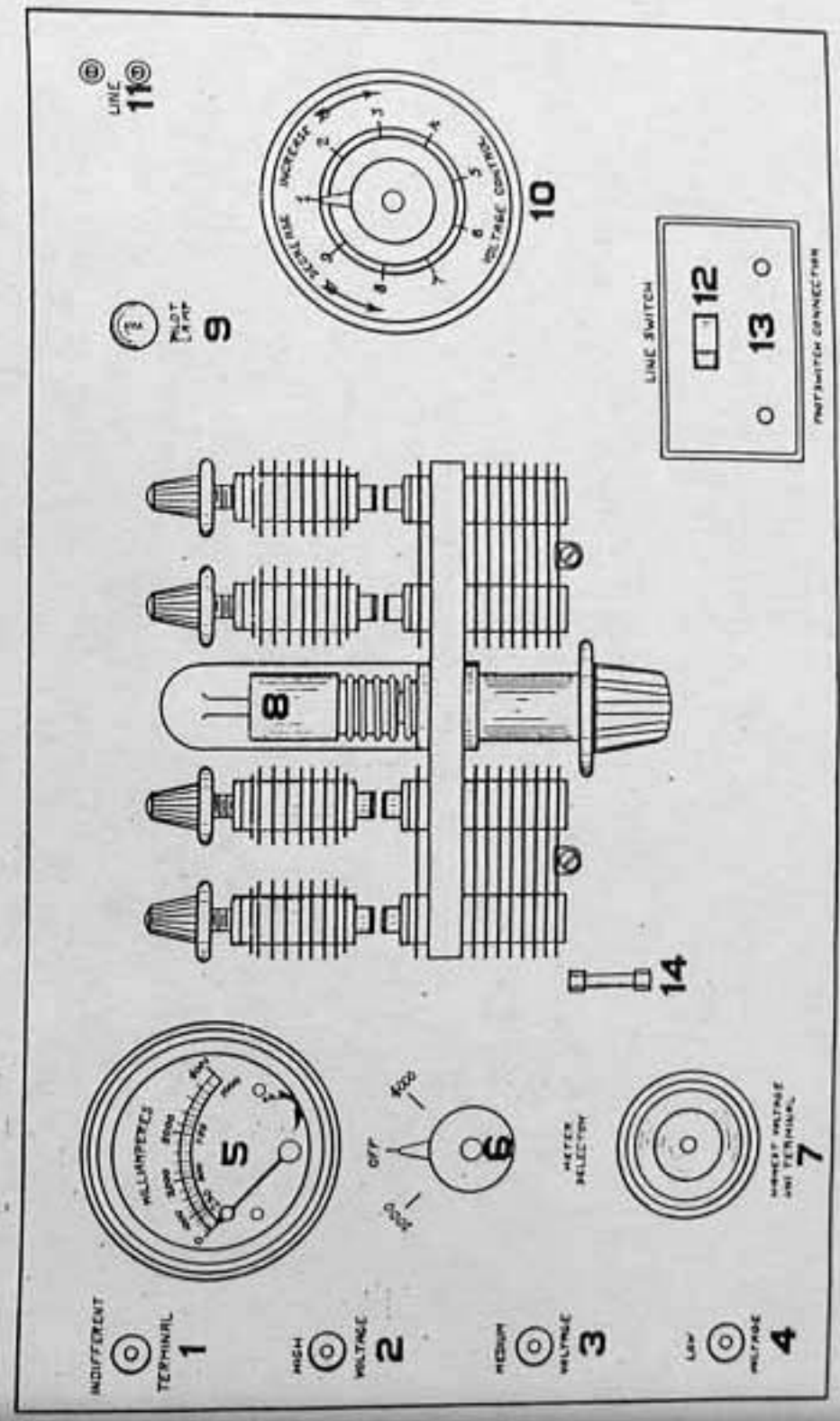


Diagram of Controls and Outlets on "G2" Outfit

Whether Intelligence rules
all things, or Chance rules.
Man must use the Power
that he has and
be Tranquil.

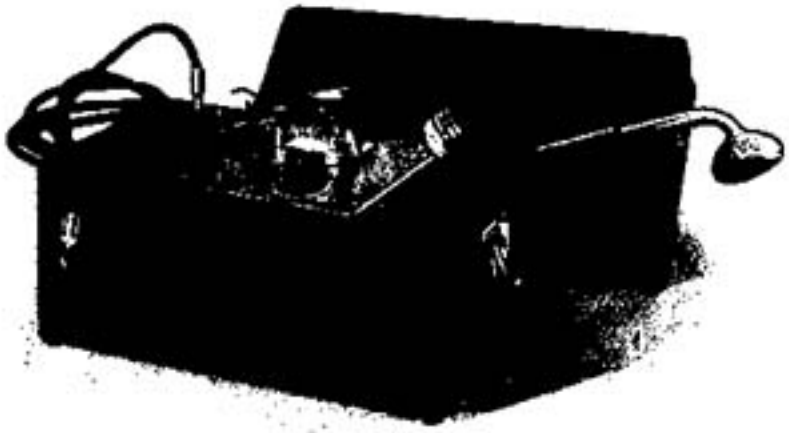
OUR AIM

Crush Skepticism
and Mistrust

OUR METHOD

Untiring Use of a
Battering Ram of
Fair Dealing





Type "J"

High Frequency and
Violet Ray Generator

MANUFACTURED BY

H. G. FISCHER

Office, 1579 Milwaukee Ave.
Factory, 2009-11 Raymond St.

AGO, ILLINOIS.

WHAT ARE HIGH FREQUENCY CURRENTS ?

THIS QUESTION MADE CLEAR IN A GRAPHICAL WAY BY COMPARISON WITH WATER.

In our demonstration we will assume that the voltage will be the water pressure at the hydrant. When we increase the pressure we increase the amount of water we can draw due to the speed with which the water flows.

The voltage obtained from Type "J" coil is 40,000 volts or approximately 400 times the voltage of the average electric lamp used. If you were to touch both terminals of a lamp socket, you would receive a severe muscular shock, though the voltage of the current would be only 1-400 of what you would receive from Type "J" coil.

Let us see what 400 times the pressure of the water at the hydrant would mean. Upon opening the faucet a stream of water would travel at such speed that anything brought into contact with it would be struck as with a blow from a sword.

This same condition would prevail if electrical currents of 40,000 volts were permitted to enter the human body. It would be as a sword thrust that would cleave from head to heel.

Now let us take this tremendous pressure and force water through an atomizer with hundreds of thousands of tiny holes. The result would be a mist of spray, that would penetrate the entire sorrounding atmosphere. The most delicate of flowers could be refreshed and could thrive when treated in conditions produced in this manner.

In the generation of high frequency currents, an electrical condenser is connected in the circuit, acting as does the atomizer, in separating the flow into minute impulses of such rapid succession that no sensation effects the nervous centers. Likewise there is no muscular contraction.

The operator therefore has at his command a tremendously powerful agent, from which more benifit can be derived in a few seconds treatment than with hours of the one time popular battery outfit.

The worth of a tool like a promissory note, depends upon the name of the maker. Tywe "J" is backed by experience and a maker, whose guarantee assures you that you have the best that can be made.

There is no quackery or uncertainty about it, and it is not put forward as a "cure-all"; but being a thorough cell massage and peculiarly healthy stimulant, its intelligent use is a wonderful aid in restoring the normal equilibrium wherever it has been disturbed and the physical condition impaired from almost any cause, and used as directed with ordinary discretion, its results are almost universally beneficial and never harmful.

Anyone, once initiated into the results obtained from the use of High Frequency, high potential violet ray currents such as generated by Type "J", finds their use absolutely indispensible.

The term High Potential is merely indicative of high pressure or voltage, the same running in various treatment machines as high as from 10,000 to 60,000 volts.

In submitting our Type "J" High Frequency Generator, we offer the result of years of experience in the manufacture of such apparatus. A combination that is Powerful, Durable and Practical, yet so simple to operate as to enable the layman to obtain satisfactory results in the treatment of a great number of ailments.

Type "J" is by no means a toy. It is substantially built upon **White Italian Marble**, and is enclosed in a **plush lined** case with **steel protection.** The trimmings are all heavily **Nickel Plated.**

GENERAL INSTRUCTIONS.

The following Instructions were carefully written expressly for the Type "J" generator, and, as extreme care was exercised in simplifying them, the novice can derive excellent results by observing them as written.

For a more detailed description, we recommend

The Prismatic Ray, by Emily Lloyd.

Abscesses Keep glass electrode No. 01 in contact with skin, moving it gently over the surface affected for 8 to 10 minutes, with medium current.

Acne Treat the entire surface with electrode No. 01 for 8 minutes. For quickest results, use Fulguration electrode No. 20, and cauterize the larger pustules by sparking.

Alopecia (Falling Hair). Use medium current with electrode No. 01 or 011. Pass back and forth over scalp for 8 minutes, daily.

Arteriosclerosis (High Blood Pressure) Daily treatments of 8 to 10 minutes will serve to lower the pressure.

Barbers Itch General daily treatment with No. 01

Boils With electrode No. 01 apply strong spark through gauze or about one eighth inch from surface.

Fulguration electrode No. 20, with milder spark can also be used with boils not discharging, after which the ozone spray is recommended.

Bronchitis Ozonize the air with the ozone generator; this is the simplest and most effective method. Sharp sparks, over chest and back, sufficient to produce reddening, give relief.

Bunions No. 01 or No. 07 electrode: Medium power, 8 to 10 minutes. Keep electrode in contact with skin, but moving slowly over entire painful area, will relieve all pain.

Callouses Use strong current with electrode No. 01 and spark directly to skin. This should produce a cauterizing effect, and should be applied about 1 or 2 minutes. Fulguration electrode No. 20 is excellent in these cases.

Catarrh (of nose). Electrode No. 01, medium current. Rub over outer surface of nose, and also back of neck. Breathing through ozone generator, using nasal tube, brings quick relief.

Cold Extremities Use full power, passing No. 01 electrode over entire surface for from 5 to 8 minutes or until a redness is produced on the skin. Keep glass electrode in contact with part throughout treatment. Repeat daily.

Corns Turn electrode No. 01 so that spark passes out of edge instead of broad face, and hold about 1-8 inch from skin. Allow sharp sparks to pass into corn for a few seconds only. Repeat in a day or two if necessary. Electrodes No. 20 and 030 are used to good advantage on obstinate cases.

Chilblains Use No. 01 electrode, strong current. Keep in contact with skin, rubbing gently for 10 minutes. Treat every other day until cured.

Deafness Ear electrode No. 017 is preferred. If no No. 017 is at hand use point of No. 04. Use only a very mild current, from 3 to 5 minutes.

Dyspepisia Electrode No. 01, strong current. Pass over region of stomach daily for 6 to 10 minutes. After an improvement is noticed, treat every other day.

Freckles Electrode No. 01, with medium current. Apply through gauze. Use daily for from 7 to 10 Min. Be patient, as results here are apt to be slow.

Goitre Some cases yield to the following treatment:- No. 01 electrode with as strong a current as can be borne without discomfort. Treat through thin gauze or in direct contact with skin, daily. No treatment to be over 6 minutes duration.

Results are not apparent until after about the 10th treatment.

Gray Hair Patient treating, every other day, will bring pleasing results, the natural color of hair generally returning. Use No. 011 Comb electrode.

Hay Fever Read-- Catarrh of nose; and treat similarly.

Headache When not caused by stomach troubles, apply electrode No. 01 with medium current over forehead and down over the ears to back of neck, with an occasional rub down the spine.

Inflamations Massage with No. 01 electrode for 5 to 8 minutes.

Influenza Breathing through ozone generator brings immediate relief.

Follow with surface electrode No. 01 treating over sides of nose. Nasal electrode No. 04 can be used to advantage, internally.

Lumbago Using electrode No. 01, treat with sharp current over and beyond entire painful area, avery other day, for about 6 to 8 minutes.

Massage Electrode No. 01 with medium or heavy current as preferred. The stronger the current used, the shorter the time required for treatment. Through heavy gauze is ideal.

Moth Patches or Moles Surface Electrode No. 01 will assist in most cases, but best results are obtained with Fulguration No. 20. Use medium or low current and apply directly to point of treatment. Bring down spring lever with index finger, making connections only at short intervals. A few seconds should suffice in one spot.

Nervousness Massage over spine with Electrode No. 01, with medium current. Treat daily at first, for 5 to 8 minutes, gradually decreasing to once in every three days, for about one month.

Neuritis Electrode No. 01, heavy or medium current. Pass over surface, gently for 3 to 6 minutes at each treatment. This gives relief almost instantly, and if possible repeat twice daily. Excellent results may be obtained in even the most stubborn chronic cases.

Pyorrhea (Loosening of the gums). Apply special Dental Electrode No. 019 directly to gums for 4 to 6 minutes, using low or medium strength current. Repeat daily.

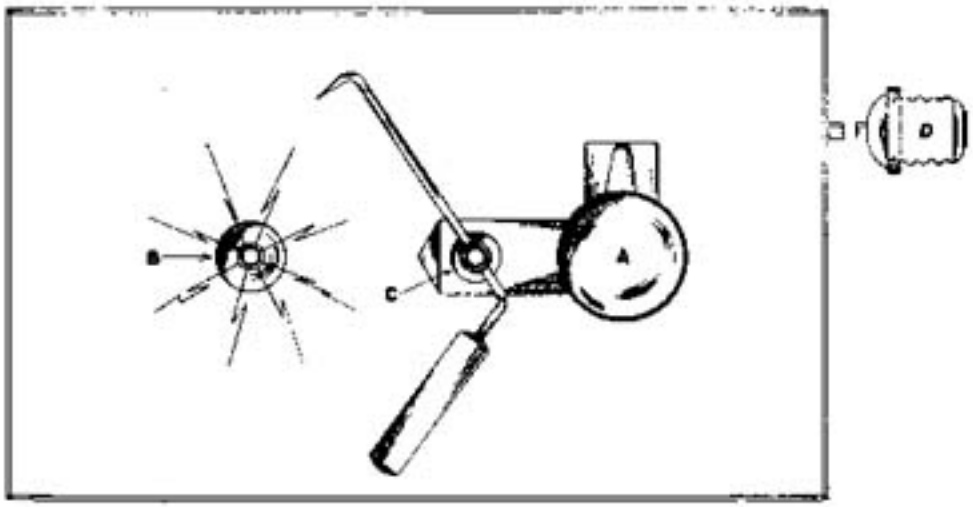
Skin Diseases Read "Emily Lloyd" on the many varied uses of the Violet Ray High Frequency on skin troubles of every kind.

Stiff Joints Apply as for Neuritis, using longer treatment if necessary.

Torticollis (Stiff Neck). Rub along back of ear and down back and sides of neck. Electrode No. 01, with medium strength current; pat the surface gently for from 6 to 10 minutes.

Warts Electrode No. 01. Hold about 1-8 to 3-16 inch from raised section and allow sparks to pass from edge of glass to same. For best results, use Fulguration Point No. 20. Let point rest directly on top of wart and press down lever several times, passing sparks through deep crustation. One treatment of 3 to 5 seconds usually is sufficient, but if no results are apparent at end of week, repeat operation.

DIRECTIONS FOR OPERATING TYPE "J"



Attach Plug "D", on green cord, to lamp socket of 110 Volts alternating or Direct current.

Screw down regulator "A" to stop, then slowly unscrew same until a smooth flow of current passes between the point of spark regulator "C" and active pole "B".

Touch pole "B" with point of "C"

Turn off current at lamp socket, and attach black cord to pole "B".

Turn on current again, and slowly open gap between "B" and "C" until the desired amount of energy passes through tube.

By turning screw "A" to left, or counterclockwise, you lower the frequency, but increase the penetration of the current. The length of spark used in treating can be adjusted by setting point "C" at different distances from pole "B".

For delicate treatments on tender areas, hold hand on electrode while making or breaking contact with the skin.

Ozone, generated by type "J" or any other High Frequency machine, is best applied through the Ozone Generator No. 22, through a solution of Oil of Pine Needles and Eucalyptus.

All of our cord tips are of the split type and can be spread with a knife blade where too loose. Friction can also be given to spark point "C" by spreading support same way.

As in our larger equipments, the same efficient protection is afforded by the Tesla Coil Protector, a device of simple design, and which because of its proven durability insures long life and dependable service. Combined with this, we have a condenser carefully designed and constructed which gives far better results than is possible with most any other machine of this size and

"DON'TS"

Don't be afraid to use your coil: It will outlive yourself.

Don't try to repair your coil. If anything happens to go wrong, send it back. Repairs cost nothing: Our guarantee extends over two years.

Don't apply electrode to sensitive tissue before trying strength on your hand.

Don't use a liniment or tonic containing over 25% alcohol while treating.

Don't allow Electrode to rest in any one spot on body for more than a few seconds at a time. Keep moving.

Don't let your electric light burn too near electrode when in use. Remember you are using 40,000 Volts, and the discharge to the surrounding air will soon burn out the lamp.

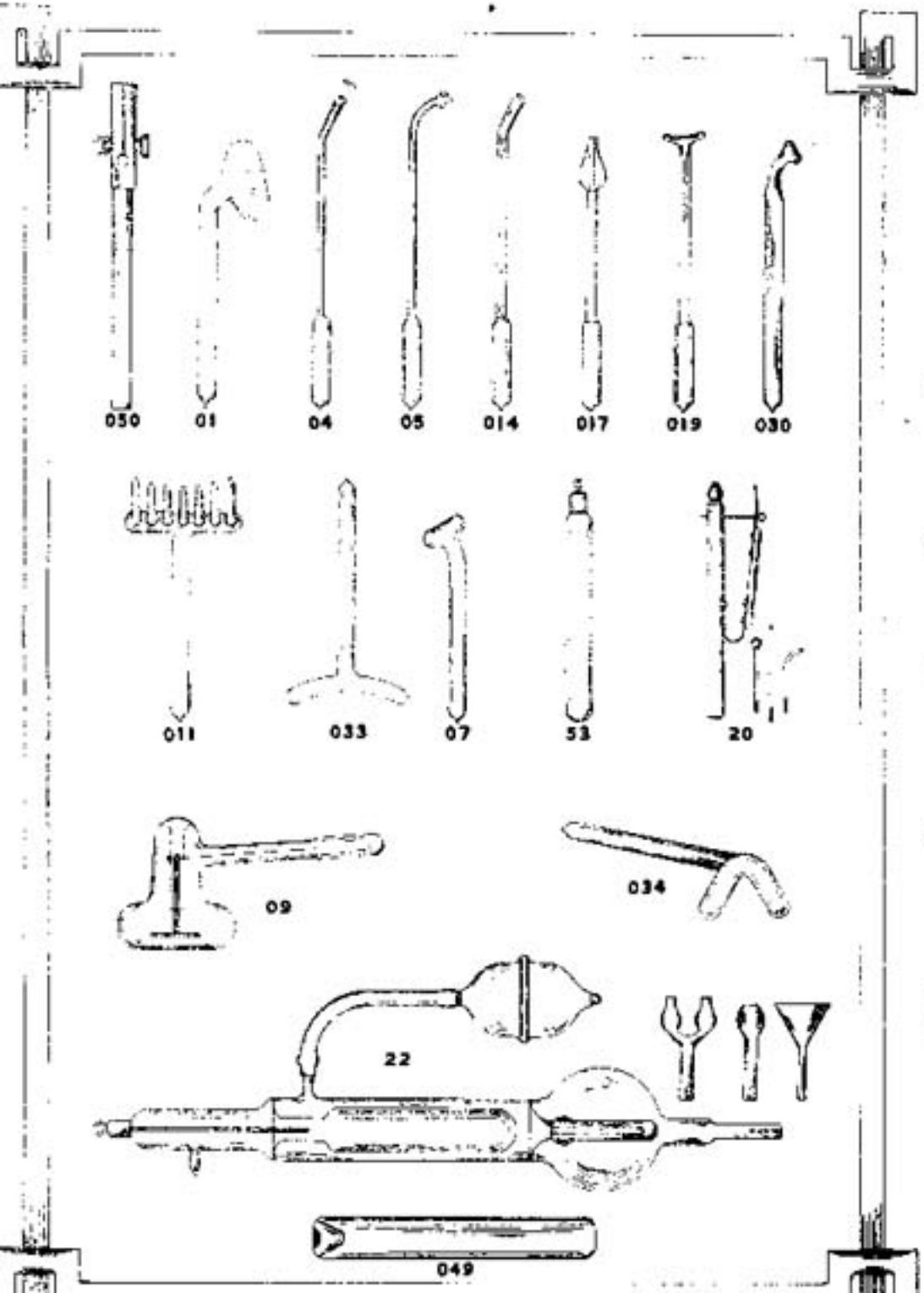
Don't expect results too soon.

Don't limit the use of your coil to one or two cases only; write for latest books on the subject.

Don't Blame your coil if you cannot get a spark: look at your own wiring.

The coil is made under a guarantee, and is carefully inspected.

And Don't forget, we have other goods of the same high quality.



INDIRECT TREATING.

Connect Insulated cord to metal end of No. 53 handle.

Let Patient hold Glass handle with both hands.

Regulate current according to amount desired, and treat by applying fingers to surface.

You will find this an excellent way to get at parts of body which are somewhat hard to reach with the Glass electrodes.

Neutral Pole "C" has cavity to which you can connect cord and handle No. 53.

By using another cord and connecting regular handle, a powerful current can be applied through any electrode.

Read "Emily Lloyd" for general treatments with this method.

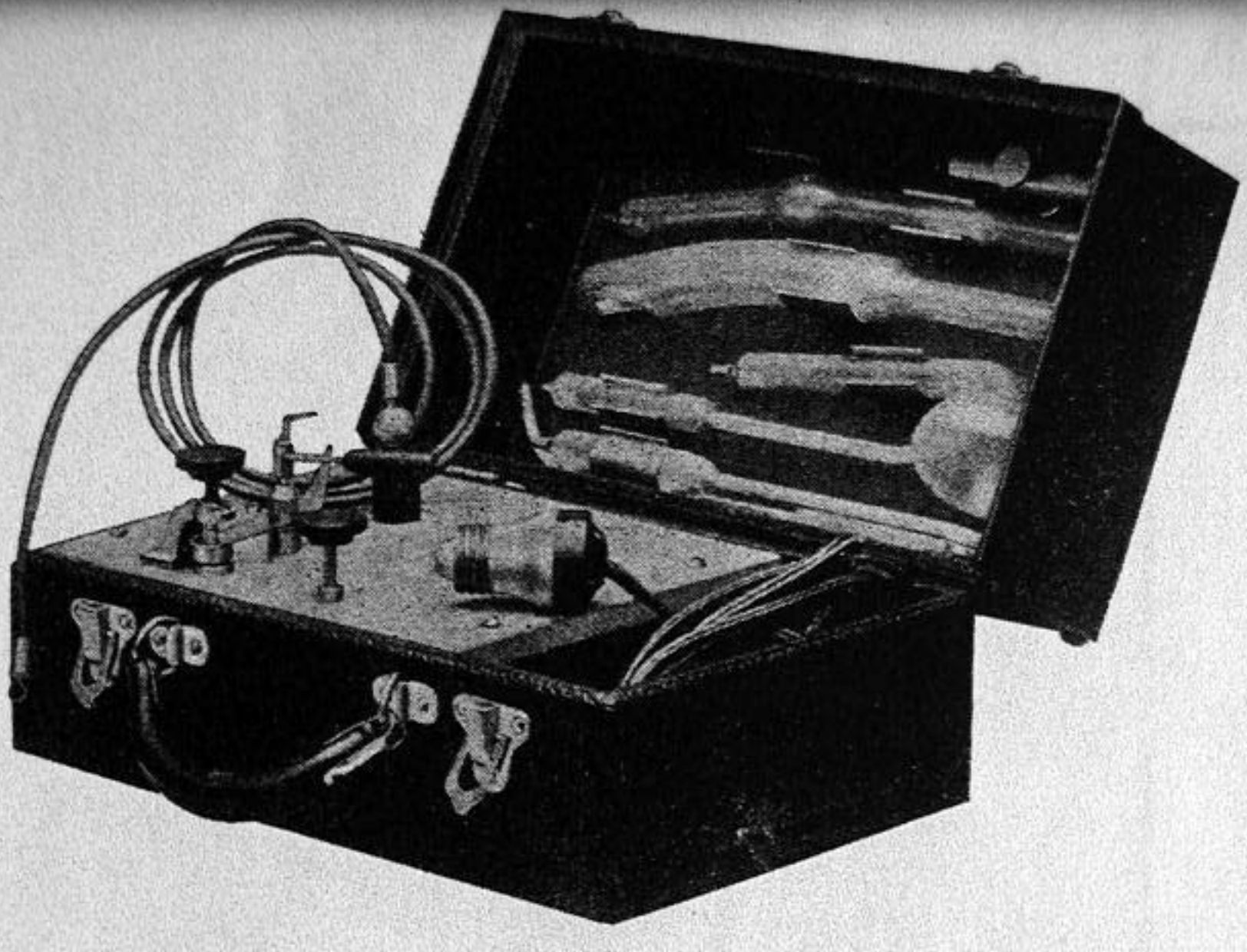
Type "J" Coil is guaranteed for a period of 2 years from date of purchase against inherent defects.

PRICE LIST

Type "J" Outfit, including No. 1 Surface Electrode, Insulated Cord and Handle		$ 15.00
The Prismatic Ray, by Emily Lloyd		$ 1.50
No. 01	Surface Electrode	.75
04	Inner Nose "	.75
05	Inner Throat "	.75
07	Bunion "	.75
011	Comb "	2.00
014	Inner Nose " Insulated	1.50
017	Inner Ear " "	1.50
019	Special Dental " "	1.50
20	Fulguration " (For Moles)	2.00
22	Ozone Generator, complete with Bulb Nose Pieces & Oils	10.00
030	Corn Electrode	.75
035	Outer Throat Electrode	.75
054	Spine "	.75
53	Glass Handle for Indirect Treating	1.00
049	Special Insulated Handle	1.00

2-5 0


Fisher
CHICAGO, ILL.



Type "F"

Complete Physician's Portable
High Frequency and
Violet Ray Generator.

Manufactured by

H. G. FISCHER
2009-11 Raymond St.
CHICAGO ILL.

There is no quackery or uncertainty about it, and it is not put forward as a "cure-all", but being a thorough cell massage and peculiarly healthy stimulant, its intelligent use is a wonderful aid in restoring the normal equilibrium wherever it has been disturbed and the physical condition impaired from almost any cause, and used as directed with ordinary discretion, its results are almost universally beneficial and never harmful.

The practitioner once initiated into the results obtained from the use of high frequency high potential violet ray currents such as generated by Type "F" finds their use absolutely indispensible.

We pride ourselves in the extreme high frequency produced by Type "F" Violet Ray Generator. We have a current here that the Physician can use with absolute safety to himself and his patient, and rest assured that he has done all that can be done in the shortest possible time.

Type "F" is not a toy and we want to call your attention to the fact that when Button E is pressed to bottom, you have a powerful current to deal with. A current that may aggravate or even burn your patient, when used where not indicated. (We refer chiefly to internal treatments.) Therefore we say play safe, doctor, and remove Button E entirely when you are doing delicate work. This will positively assure you that you are using currents of highest possible frequency.

No other outfit has this feature and the physician using other outfits is compelled to regulate as best he can with a current of medium power, which is neither high nor low enough in frequency to cover all cases.

Bear in mind that all internal treatments must be made with extreme high frequency to avoid discomfort to the patient and Plug "E" must be pulled out.

Another feature combined in every Type "F" is a Tesla Coil protector, which insures long life and enables us to guarantee it for twice the length of time of any other coil. Hence our statement it will outlive you.

Type "F" outfit is substantially built upon **White Italian Marble,** and is inclosed in a **plush lined** case with **steel Valence** The outer trimmings being of **brass** heavily nickel plated.

GENERAL INSTRUCTIONS

For the use of high frequency violet rays generated by Type "F" outfit

We recommend the more detailed method of instruction as given in the following text-books.

High Frequency Manual.....	Eberhart...	$2.50
High Frequency Currents.....	Strong.....	3.00
Currents of High Potential....	Snow.....	3.50

The following are a few suggestions for treating diseases taken from cases where physicians have obtained excellent results. Not all of them through high frequency alone, but as a valuable adjunct in the treatment thereof.

Abscesses Electrode No. 1. Keep in contact with skin and treat for 5 to 7 minutes with medium spark high frequency current.

Acne The fulguration electrode No. 20 is used for quickest results. Cauterize the larger pustules and treat the entire surface affected with the No. 1 Electrode for a few minutes.

Acne Rosacea Electrode No. 1 or No. 2. Medium frequency. Keep electrode away from surface to get cauterizing effect of spark. Duration of treatment to be decided by severness of case. Where much surface is to be covered lengthen time to 10 minutes.

Read Eberhart's Manual, pages 164 to 168.

Alopecia Electrode No. 1 or No. 11. Use medium frequency over the scalp for 5 minutes. If current is too strong use higher frequency and lengthen the time.

Anus Fissure of Electrode No. 2 is to be used. Treat about 4 to 6 minutes with high frequency current as strong as patient can bear without discomfort.

Diagnosis like Criticism is of little avail unless it travels hand in hand with Remedy, Treatment and Cure.

Headache When not caused by stomach apply Electrode No. 1 with medium spark high frequency over forehead and back over the ears to back of neck. Occasionally down the spine.

Hemorrhoids Use rectal electrode No. 2 or 12. Use delicate High frequency current. To remove use fulguration Electrode No. 20.

Hypertension Auto condensation produces most rapid results.

See Arteriosclerosis.

Hypotension Apply Electrode No. 1 to spine with heavy spark.

Impotence Use insulated rectal Electrode No. 12 across the genitals with medium to high frequency current, for 4 to 6 minutes.

Influenza Breathing through ozone generator brings immediate relief. Follow with treatment over sides of nose and in some cases use nasal electrode internally.

Lumbago Electrode No. 1 with sharp spark over and beyond painful area. Treat every other day for about 6 minutes.

Massage Electrode No. 1. Medium or low frequency as preferred by patient. The lower the frequency and the sharper the spark the shorter the time required for treatment. Through heavy gauze is ideal.

Moth Patches or Moles Fulguration Electrode No. 20 with medium or high frequency, Do not overtreat as 1 to 2 minutes suffices over a small area.

Nervousness Treat over spine with medium to high frequency. Daily treatments at first, followed by treatments every three days for about one month.

Neuritis Surface Electrode No. 1, heavy current high frequency. Relief almost instantly. Do not treat over same surface over 5 minutes, but treat twice daily if at all possible. Results are most pleasing even in chronic cases.

Paralysis Electrode No. 1 with sharp spark of medium frequency. Apply over muscles in contact and by patting. Raising the Electrode about 1-4 to 1-2 inch above the surface. Treatments should be made daily and be of 4 to 8 minutes duration.

Prostatic Diseases Special Electrodes are made for treating diseases of the prostate, but excellent results have been obtained by use of Electrode No. 12, in reducing enlarged prostate. A mild medium frequency is used for 5 to 10 minutes.

Pyorrhea Alveolaris Apply Special Dental Electrode No. 19 to gums for 3 to 5 minutes, using high frequency and in direct contact with the gums.

Rheumatism Combine treatments as given in Neuritis and Paralysis.

Rodent Ulcer Best results are obtained with X-Ray. Fulguration Point No. 20 has been used to destroy the affected tissue.

Skin Diseases The Dermatologist will find many uses for the high frequency current due to its cauterizing, escharotic and antiseptic properties. Read any good book on the subject of high frequency or high potential currents.

Sciatica Body Electrode Medium frequency. Apply for 5 to 7 minutes.

Stiff Joints Apply as for Neuritis with longer treatment if deemed necessary.

Throat Diseases Use Throat Electrode No. 5 or No. 18 with mild current high frequency. Finish by treating above and below larynx with Electrode No. 33. Duration of treatment about 8 minutes.

Torticollis (Stiff Neck) Treat back of ear and down back and sides of neck. Use Electrode No. 1 with sharp spark medium frequency; patting the surface gently. Give treatments of 10 minutes or longer.

Trachoma Apply eye electrode No. 8 with highest frequency. Treat over closed eye lid for one to 3 minutes.

Ulcers (Chronic) Treat through gauze with as sharp a spark as can be tolerated, using Electrode No. 2 or surface No. 1. Ozone generator can be used to advantage by employing the spray.

Uterine Diseases Use Electrode No. 13 and apply with highest frequency for short periods. Beneficient results are always obtained.

Don't let your patient sit close to a radiator while treating.
Don't let your electric light burn too near your patient. Remember you charge him with 60,000 volts and the discharge of current from his body to the surrounding air will soon burn out your lamp.
Don't expect results too soon.
Don't limit the use of your coil to one or two cases only, write for latest text books.
Don't blame your coil if you cannot get a spark, look at your own wiring. The coil is made under a guarantee and is carefully inspected.
And don't forget we have other electrical goods of equal quality.

PRICE LIST

Type "F" outfit complete	$ 30.00
Type "F" outfit with addition of Cautery circuit	32.50

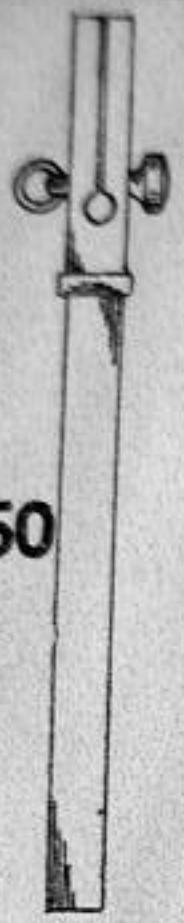
VACUUM ELECTRODES

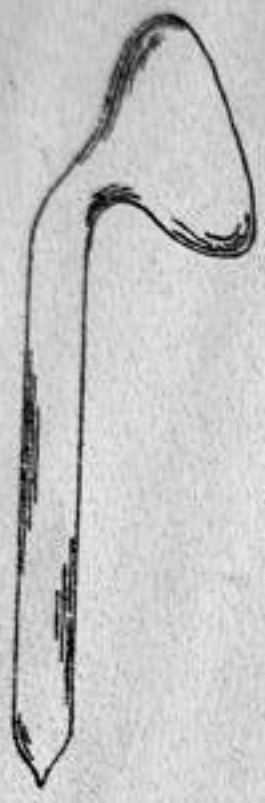
No. 1.	Surface	$ .75
2.	Rectal	.75
3.	Vaginal	75
4.	Nasal	.75
5.	Throat	.75
6.	Urethral	.75
7.	Eye, Single	.75
8.	Eye, Double	1.00
9.	Metal disc body electrode	3.00
10.	Dental, surface, insulated	1.50
11.	Comb electrode	1.50
12.	Rectal, insulated.....(Prostatic)	1.50
13.	Vaginal, insulated	1.50
14.	Nasal, insulated	1.50
15.	Post nasal, insulated	1.50
16.	Urethral, insulated	1.50
17.	Ear, insulated	1.50
18.	Tongue, insulated	1.50
19.	Dental, insulated	1.50
20.	Fulguration	2.00
21.	Ozone generator	7.50
22.	Ozone generator complete with bulb	10.00
30.	Corn Electrode	.75
33.	Throat Electrode (outer)	.75
50.	Universal handle insulated	1.00
51.	High frequency cord (heavy)	.75
52.	Metal handle for indirect treatments, extra long	.65
53.	Glass handle for indirect treatments	1.00
301.	Cautery handle adjustable to 5 positions	1.50
306.	Cautery Cords per pair	1.00
305.	Cautery knives any shape	.75
Complete set of SNOW'S electrodes Nos. 1, 2, 3, 4, 5, and 6		3.50

We also Manufacture and carry in stock a complete line of Electro Therapeutic Apparatus, which includes the following;

Auto Condensation Treatment Outfits
Auto Condensation Pads
Diathermic Treatment Outfits
X-Ray Plates and Equipment
High Frequency Outfits
X-Ray Generators
Thompson-Plaster Electrical Cabinets
Diagnostic Light Regulators
Portable Combination Outfits
Cautery Transformers
Cautery Equipment
Therapeutic Lamps
Head Lamps
Dental High Frequency Outfits
Dental Wall Plates

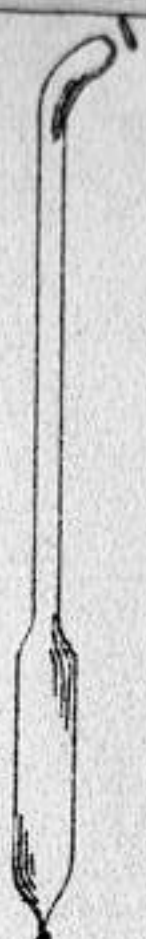
Ask your nearest dealer. If he will not supply you, send your order direct to us.




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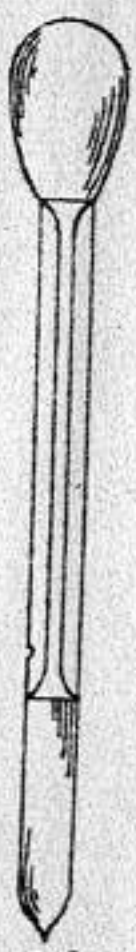

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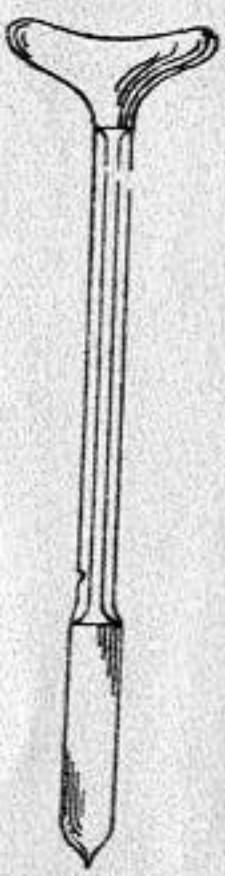

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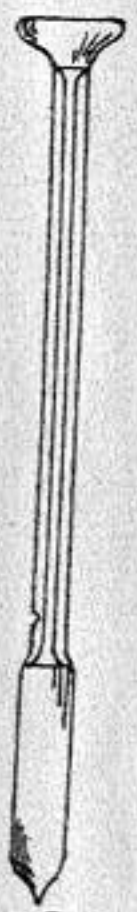

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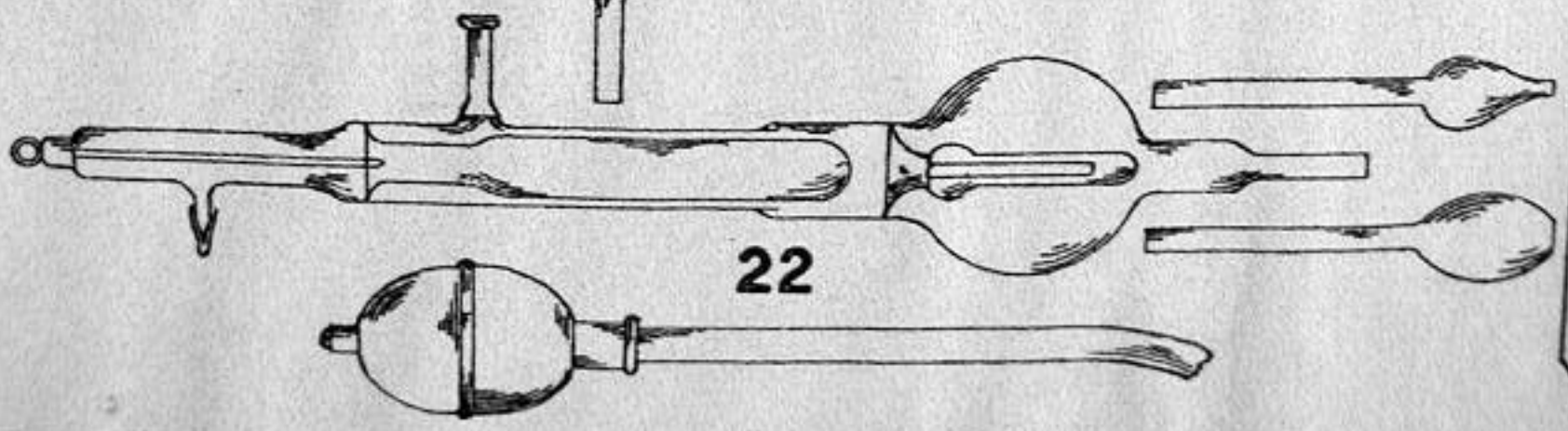

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TYPE "F" COIL

is guaranteed for a period of 2 years from date of purchase against inherent defects.

Whether Intelligence rules
all things or Chance rules,
Man must use the Power
that he has and
be Tranquil.

CHERRY ELECTRODE

CAUTION

NEVER turn the diathermy current through this electrode unless in actual use. For test purposes, insert in a piece of meat before turning on current. The Monel Metal plates on the active tip are of neccesity seperated by only ⅛ of an inch, and although the insulating material is the finest procurable, unless these plates are in actual contact with tissues the diathermy voltage may rise to a point sufficient to leap across the outer surface, and the carbon thus deposited, by this short circuit will form a path for future leakage. When the electrode is inserted into a conducting medium there is absolutely no danger of short circuiting.

H. G. Fischer & Co., Inc.

FORM 1293 PRINTED IN U.S.A.

THE CHERRY CERVICAL COAGULATING ELECTRODE
(Cherry Electrode Technic)

A bipolar instrument for destroying the glandular tissue in the cervical canal, by diathermy coagulation.

The first point of advantage in consideration of this bipolar instrument for treatment in chronic endocervicitis is that uniform destruction of the glandular tissue is carried out throughout the entire length of the canal at one treatment. This feature on proper consideration is a highly valuable asset since uniform destruction cannot be accomplished by any other procedure.

When using cautery for example, results are in a large measure dependent upon the skill of the operator, and regardless of how skilled he may be there is grave danger that a considerable amount of the endocervical glands will remain after the treatment, and consequently require additional treatment four or five weeks later. On the other hand, when using cautery, even the most skilled operator may, in his effort to remove all of the glandular tissue, permanently damage the underlying musculature with the resultant loss of function of the muscle, and with the possibility of stenosis.

This bipolar instrument makes possible the predetermination of the extent of destruction which is to be accomplished. It is possible to ascertain in advance of the treatment that a certain milliampere reading on a certain machine will, in a certain number of seconds, produce the desired 4 mm. coagulation within the endocervical canal. We may indeed class the Cherry technic as an exact procedure, mainly because of the fact that both poles of the electric circuit are in close proximity on the electrode. Should the indifferent electrode, instead, be placed around the body or on the abdomen or lower spine, and the unipolar electrode be placed in the cervical canal, there is absolutely no way of determining just how much electrocoagulation is going to be brought about in a certain length of time, at a stated milliamperage or how deep the current is likely to penetrate because of varying pathological resistance in each individual patient.

Another point in favor of this procedure is its extreme simplicity. This technic requires far less manual skill than is required when utilizing cautery, currette or electro-surgical tissue-cutting technic. It is a practically painless procedure, no anaesthesia being required in the average case, and at the same time it is ambulant. The patient does not sacrifice occupational time, nor subject to subsequent menstrual disturbance.

Since this method enables the removal of the endocervical glands with the least destruction of uninvolved muscular tissue - less than any other method now available - there is naturally less chance of stenosis and functional impairment of the cervix.

The absence of hemorrhage by this method is noteworthy.

Another point in connection with this procedure is that the type of infection and the degree of virulency of that infection of the cervical canal seems to be entirely irrevelant as far as the Cherry treatment is concerned; in other words, there seems to be no contraindication, and about the only other suggestion

connected with the technic, other than the collapsing of the speculum and the proper rotation time of the electrode, plus of course the proper amount of milliamperage, is that the operator should endeavor to recognize the "feel " of the internal os and be able to retract the active point of his electrode 1 mm. or 2 back from this muscle before actually turning on the current. Even this, however, is not important since the only resultant damage of getting in close proximation or even through the internal os is a slight discomfiture as would be manifested by referred pain on the part of the patient.

No anaesthesia is employed for this work, though occasionally a patient, probably one of the neurotic type, complains a trifle. This is not important since the entire treatment is of short duration.

For the best end results it is apparent that relatively slow, even coagulation such as would leave the coagulated area entirely soft, would be most desirable. Recent end results seem to point to a long, slow coagulating time--from 20 to 40 seconds have been used very successfully.

STENOSIS

Stenosis is generally due to failure of proper treatment following coagulation.

If the uterine cervix is coagulated to the normal depth of the Cherry instrument, even without over-coagulation, there is a normal slough--which together with a nominal amount of drainage of lymphatics would bring about a condition favoring agglutination. Therefore a certain amount of after-treatment is essential following coagulation.

The patient should be instructed to douche twice daily with an ordinary saline solution....and further to return to the doctor's office at least once or twice a week so that the debris resulting from coagulating, can be removed with the result that the entire cervix and canal included, is kept in a patent condition - thus favoring a proliferation of epithelium from the external to the internal os - and consequent complete recovery.

After-treatment should be maintained until the physician is thoroughly satisfied that the original chronic endocervicitis has entirely subsided. Needless to say - in the event of over-coagulation - it is highly essential that after-treatment be emphasized.

Most stenoses are brought about by over-coagulation or coagulation which has been accomplished too rapidly by over-dosage.

ADDITIONAL SUGGESTIONS REGARDING PAIN, HEMORRHAGE, STENOSIS AND CYSTS

Pain during treatment in the endocervical canal by the Cherry Electrode is obviously due to one of two factors--either faulty technic or a faulty apparatus, or we might add, a good diathermy machine in poor condition. Some pain may be noted when the inner os is contacted. Electrode should be placed into the cervical canal until the operator feels contact with the inner os, and then it should be withdrawn about 1/16th of an inch. The sensitivity at this point is then overcome.

It is advisable to investigate thoroughly not only the type of diathermy machine used but its condition.

Old model diathermy machines, dating back a number of years, were built to operate in connection with the glass vacuum electrodes which were in vogue at that time, and that with the advent of direct metallic contact to the skin all diathermy machines required refinements not incorporated at that time.

Modern diathermy outfits produce currents entirely devoid of shock to the patient. Bear in mind that the diathermy voltage must be low, and to obtain this low voltage the spark interrupter gaps must be fairly close together.

If the tungsten tips are pitted, the sparking will be longer as well as irregular. Longer sparks across the gaps mean higher voltage, and irregular sparks produce Faradism.

If too much current is employed in the coagulation of the cervical tissue, there is likely to be some amount of pain (often considerable) attending the procedure. Try out the Cherry Electrode on a piece of raw meat before actually using it in the cervix, setting the controls on the diathermy machine so as not to produce coagulation in under 10 seconds, with a preference for an average of around 20 seconds.

Slow coagulation will reduce pain to a very minimum, and insure more perfect end results.

Another matter to bear in mind always is the absolute necessity of opening and draining existent cysts, if completely satisfactory end results are to be obtained. The FISCHER Bipolar Puncture Electrode Tip, Catalog No. 2556, which is arranged to fit the Catalog No. 2526 Cherry Handle, should be used for this purpose.

ELECTRO-MECHANICAL OPERATING INSTRUCTIONS

The following explanation is to aid physicians who are undertaking the Cherry technic, in establishing the proper amount of current to use.

The mode of application is first to establish the proper amount of current required and to set the controls on your diathermy machine accordingly. The question of the proper setting of a diathermy machine for purposes of electro-coagulation is one that is discussed from many angles. A great many physicians, orally and in journal articles, refer to the popular "short circuit" method, i.e., the connecting of a single diathermy cord to both diathermy outlets and in this way obtaining a "short circuit" reading on the milliampere meter.

However, this short circuiting method is inaccurate inasmuch as an indication of any certain milliamperage on one machine will not produce precisely the same results in coagulation as that same milliampere reading obtained by short circuit on another machine. Again, a short circuit of this character on a machine of low voltage will not produce precisely the same useful current as when operating a machine of medium or high voltage. Too much depends upon the length of the cord, whether the cord is hanging in a loop or whether forming two parallel lines, or coiled. The resistance of the contact from the cord tip to the machine is also important.

Again, most modern diathermy machines are fitted with a blocking condenser, the object of which is to prevent all possible shock to the patient. That is a very valuable addition and is incorporated in all up-to-date Fischer models, but it alters by a large percentage the former short circuit readings recommended.

It is for this reason that we have produced the Fischer Diathermy Pre-Adjustment Unit, Catalog No. 2447. With the proper use of this unit all the foregoing inaccuracies are removed and the setting of the machine becomes a scientific procedure. This unit is placed in series with the short circuiting cord. The tip end of the unit is placed into the low or medium voltage outlet of the diathermy machine. A diathermy cord is plugged into the other or socket end of the unit and to the indifferent outlet on the machine. A complete electrical circuit is now formed by means of this cord through the unit.

To adjust the output of a machine for endocervical coagulation (Cherry technic) set the primary control to approximately two-thirds of its capacity, and gradually open the spark interrupter points until a reading of 500 M.A. is registered upon the meter. Shut off the current and remove your Pre-Adjustment Unit. Connect the Cherry Bipolar Electrode to the same terminals used in making this test except that now the Pre-Adjustment Unit HAS BEEN REMOVED FROM THE CIRCUIT. The machine is now set to reproduce the Cherry technic and should produce coagulation to the depth of 4 mm. in 20 to 30 seconds.

If you have an older type diathermy machine and prefer the direct short circuit method, set your controls to deliver 2,000 M.A.

CAUTION

NEVER turn the diathermy current through the Cherry Electrode unless it is actually engaged in tissue substance. For test purposes, insert in a piece of meat before turning on current. The monel metal plates on the active tip are of necessity separated by only 1/8 of an inch, and although the insulating material is the finest procurable, unless these plates are in actual contact with tissue, the diathermy voltage may rise to a point sufficient to leap across the outer surface, and the carbon thus deposited by this short circuit will form a path for future leakage.

H. G. FISCHER & CO. Inc.,
2323-2337 Wabansia Ave.,
Chicago, Illinois.







CHERRY ELECTRODE

CAUTION

NEVER turn the diathermy current through this electrode unless in actual use. For test purposes, insert in a piece of meat before turning on current. The Monel Metal plates on the active tip are of neccesity seperated by only ⅛ of an inch, and although the insulating material is the finest procurable, unless these plates are in actual contact with tissues the diathermy voltage may rise to a point sufficient to leap across the outer surface, and the carbon thus deposited, by this short circuit will form a path for future leakage. When the electrode is inserted into a conducting medium there is absolutely no danger of short circuiting.

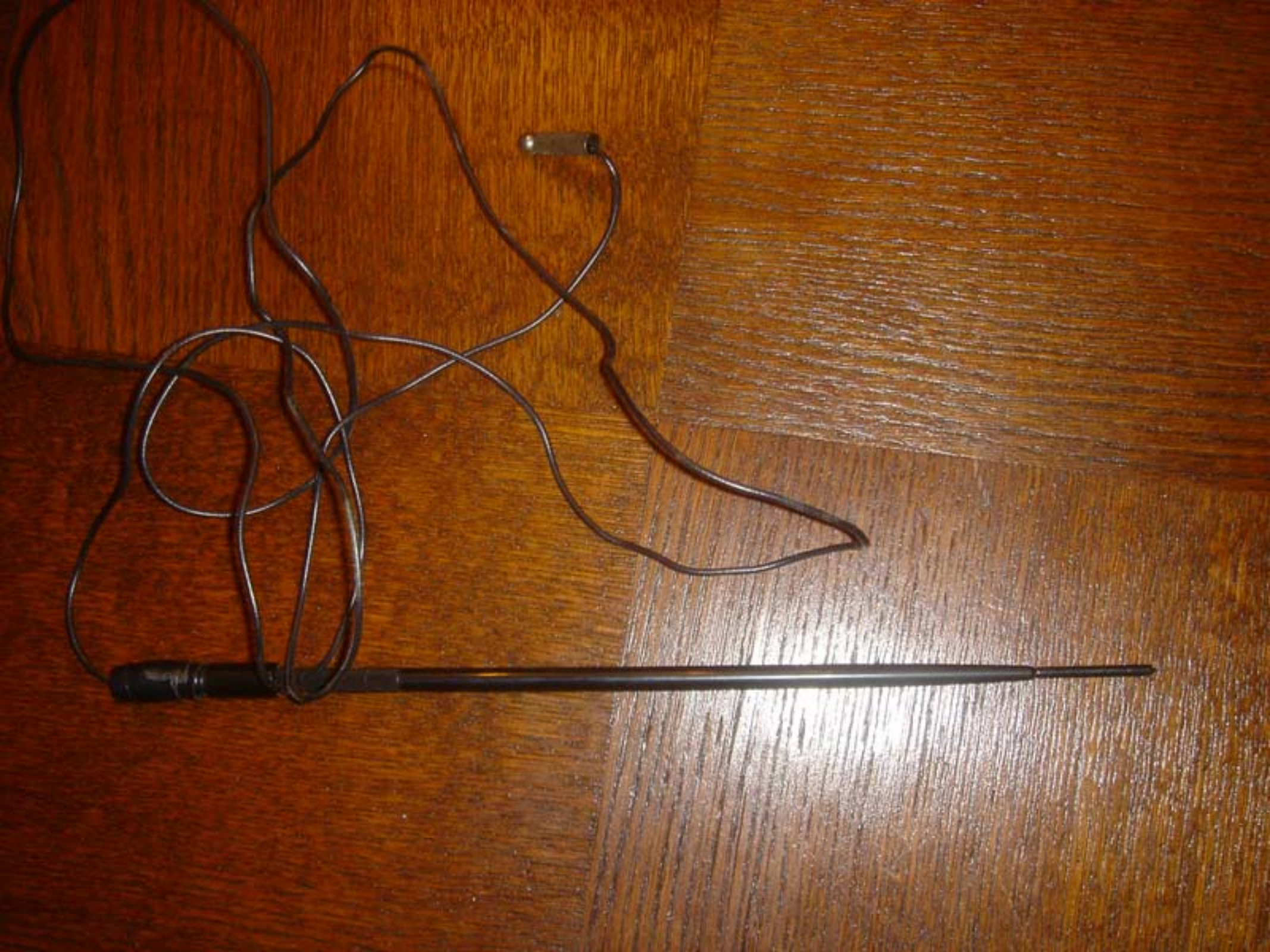
H. G. Fischer & Co., Inc.

FORM 1293 PRINTED IN U.S.A.


CHERRY ELECTRODE
CAUTION
H. G. Fischer & Co., Inc.











This is the finest Sheet Electrode material, composed of an interior of specially prepared soft lead alloy with a covering of **PURE ROCK TIN** on both sides. Affords smooth, clean cutting. Is readily cut with scissors.

Round all corners and smooth down sharpness of cathodes. When extra heavy dielectric currents are indicated, employing large electrodes, it is suggested that the edges of these electrodes, be serrated or notched, to increase conformity to part and to eliminate hot spots.

THE ROLLER ON WHICH THIS MATERIAL IS PACKED IS OF VALUE between applications. for rolling wrinkles out of electrode

PUT UP ONLY BY

H. C. FISCHER & CO. [illegible]

This Package contains ... Lbs. Catalog No. 8-48-5

"FISCHER'S" SPECIAL SHEET BLOCK TIN

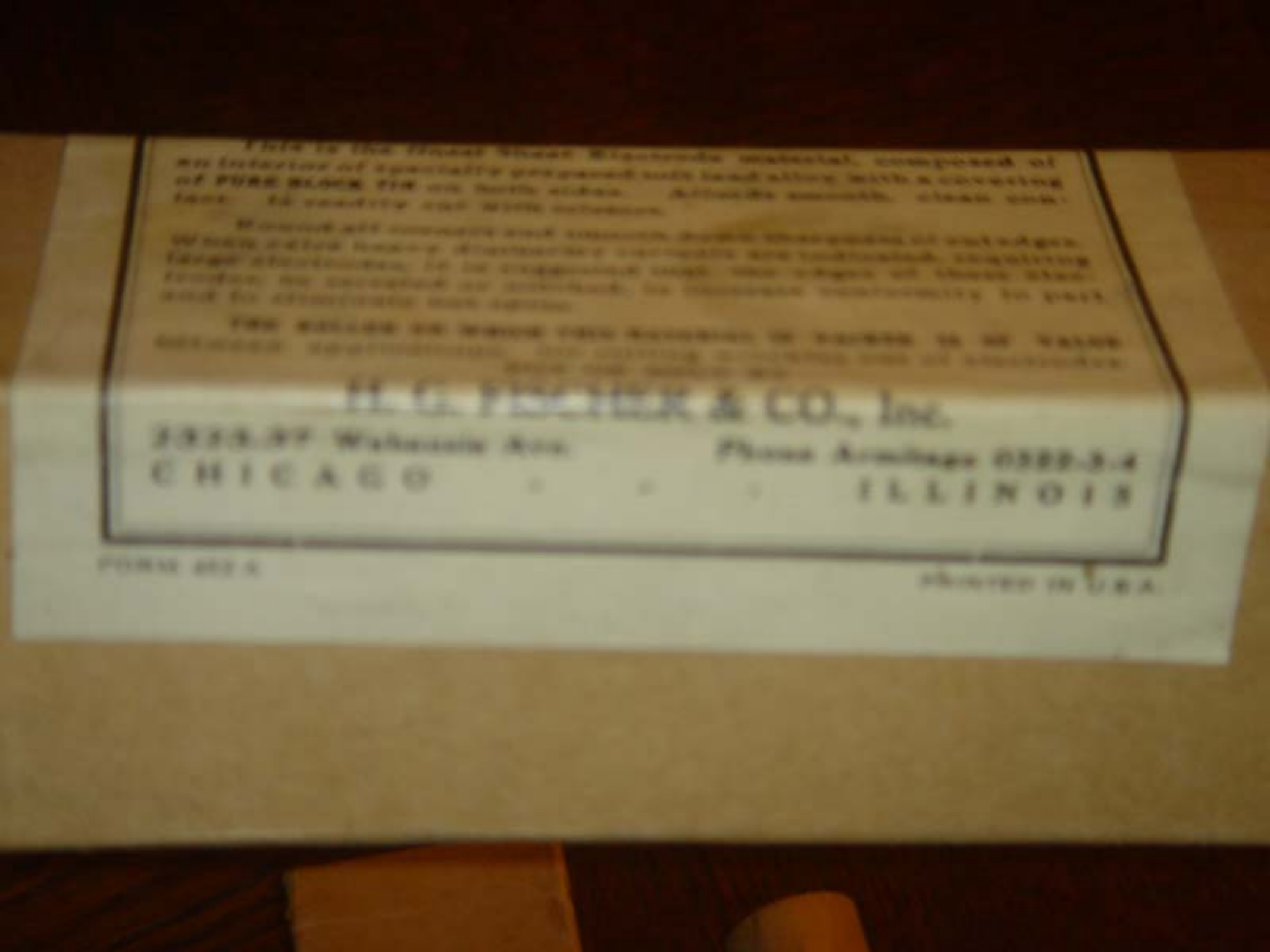
This is the finest Sheet Electrode material, composed of an interior of specially prepared soft lead alloy with a covering of PURE BLOCK TIN on both sides. Affords smooth, clean contact. Is readily cut with scissors.

Round all corners and smooth down sharpness of cut edges. When extra heavy diathermy currents are indicated, requiring large electrodes, it is suggested that the edges of these electrodes, be serrated or notched, to increase conformity to part and to eliminate hot spots.

THE ROLLER ON WHICH THIS MATERIAL IS PACKED IS OF VALUE between applications, for rolling wrinkles out of electrodes.

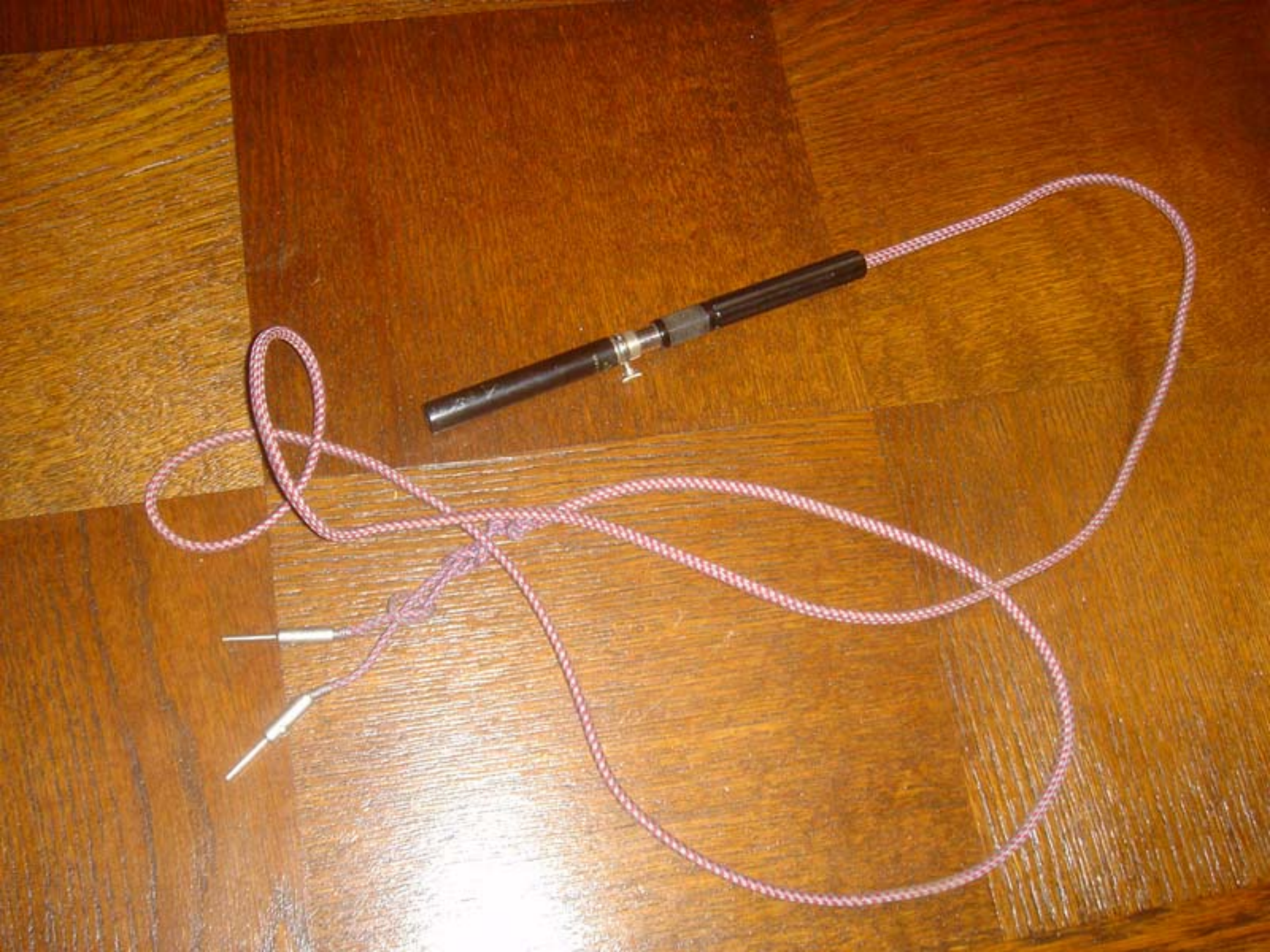
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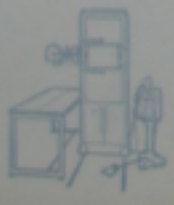

MODERN SHOCKPROOF X-RAY AND ELECTROMEDICAL EQUIPMENT

Distinguished for Outstanding Performance and Great Durability

ULTRASONICS




H. G. FISCHER & CO.






FIVE IMPORTANT FEATURES
of
H. G. FISCHER & CO
PRODUCTS . . .

1 EFFICIENCY
2 DURABILITY
3 SERVICE
4 ECONOMY
5 ATTRACTIVENESS



H. G. FISCHER & CO.

Manufacturers
X-ray and Electromedical Equipment

9451-91 W. BELMONT AVENUE
FRANKLIN PARK, ILLINOIS
(SUBURB OF CHICAGO)

ULTRASONICS



H. G. FISCHER & CO. Model No. 6
ULTRASONIC GENERATOR

Manufactured solely in Franklin Park, Illinois

Extremely Low Priced



The H. G. Fischer & Co. Model No. 6 Ultrasonic Generator is practically trouble-free and simple to operate. It consists of a single-tube rectified and filtered power supply, a single-tube oscillating circuit and a shielded, flexible coaxial cable connecting the oscillating circuit to the Transducer.

The Model No. 6 is manufactured in Franklin Park, Ill., (a Chicago Suburb) by highly skilled craftsmen, of the finest materials, and precision engineered for efficient performance and great durability.

ELECTRONIC GENERATOR

The Electronic Generator in the H. G. Fischer & Co. Model No. 6 Ultrasonic Generator is a high-frequency oscillator of the highest quality. The electronic impulses it generates and impresses upon the quartz crystals are tuned to match precisely the mechanical vibration frequency of the quartz crystal. The entire unit is completely shielded and is equipped with a specially constructed line filter that reduces feed-back of high frequency on the supply line to the very minimum. H. G. Fischer & Co. Model No. 6 Ultrasonic Generator has the Federal Communications Commission Type Approval No. U-106 and the Underwriters' Laboratories Approval.

Each Electronic Generator is individually calibrated with a Siemens Sonatest—a high-precision calibration device that is the accepted method of calibration by the Food and Drug Administration.

TRANSDUCER

The H. G. Fischer & Co. Ultrasonic Transducer is composed of a quartz crystal cemented securely to the head, and an electronic contactor held firmly against the crystal by a strong spring tension. The crystal has an area of 10 square centimeters. A rubber grip prevents the transmission of vibrations into the operator's hand. The entire Transducer weighs but 12 ounces; and the flexible coaxial cable from the Electronic Generator to the Transducer weighs only 4 ounces.

The quartz crystal used in the H. G. Fischer & Co. Ultrasonic Unit is cut from the mother crystal along predetermined lines of activity and is precisely ground by specialists to a specified dimension which determines the frequency at which it will vibrate—one million cycles per second. The **frequency** of the oscillations remains constant throughout the power range of the unit. The **intensity** of the vibrations can be varied, however, by applying more or less electronic power to the crystal.

Fabrication of the Transducer is as precise and critical as that required in the preparation of the quartz crystal. The end plate, to which the quartz crystal is cemented, is made to possess exactly the same properties of oscillation as the quartz crystal to prevent it from absorbing the mechanical motion and reducing the total output. Furthermore, the Transducer is hermetically sealed to prevent the seepage of water when used in any of the under-water techniques.

The flexible coaxial cable connecting the Electronic Generator to the Transducer is shielded with Polyethylene, a vastly superior insulation specified by the Armed Forces for insulation on all battlefield communication wire and for insulation on all battlefield communication wire and cable. The cable is of ample length for use of the Transducer with a patient on a treatment table.

OUTPUT METER

The meter shows both the output in watts per square centimeter and the total output in watts—From 1/10 watt to 3 watts per square centimeter or 1 watt to 30 watts total output. By observing the meter it is easy to determine if the Transducer is in proper contact with tissue for effective treatment and also how much ultrasound output the patient is receiving. It is not necessary to depend upon unreliable lights or other gadgets.

CONTROL

A single, stepless control regulates the ultrasound output of the unit from 0 on the left to 3 watts per square centimeter (30 watts total) on the right. This is considerably higher than most other ultrasonic units, as shown by actual comparative tests.

TREATMENT TIMER

The H. G. Fischer & Co. Model No. 6 Ultrasonic Unit is equipped with a combination power switch and treatment timer which turns off the current at the end of any desired treatment time from one to fifteen minutes.

CHROME-PLATED CABINET

The H. G. Fischer & Co. Model No. 6 Ultrasonic Unit is housed in a beautiful chrome-plated cabinet 16½" long, 10" deep, and 12⅛" high. The complete unit weighs only thirty-eight pounds. A mobile utility stand is available.

Cat. No.	Code	Description
4657A	AKAAL	H.G. Fischer & Co. Model No. 6 Ultrasonic Generator
5023	TUBUL	Tubular Mobile Utility Stand

H. G. FISCHER & CO. ULTRASONIC GENERATOR

Manufactured solely in Franklin Park, Illinois



1 Federal Communications Commission Type Approval No. U-106
2 Underwriters' Laboratories Approval
3 Beautiful Chrome Plated Cabinet
4 Each Generator Individually Calibrated for Accuracy
5 Extra Large Active Crystal Surface of 10 Square Centimeters
6 Output up to 3 Watts per Square Centimeter — 30 Watts Total
7 Energy Intensity Distributed Over Entire Treatment Face of Transducer — A Mandatory Feature for Accurate Dosage
8 Easy-to-Read Meter Accurately Shows Amount of Ultrasound Patient is Receiving
9 Accurate Treatment Timer
10 Guaranteed for One Year Against Defects in Material and Workmanship

Operates from the Usual Office Wall Outlet of 120 Volts, 50-60 Cycles

ESTABLISHED 1910

H. G. FISCHER & CO. 9451-91 W. Belmont Ave., Franklin Park, Illinois
(CHICAGO SUBURB)



HOME OF H. G. FISCHER & CO.



























- OVER 100,000 SATISFIED USERS THROUGHOUT THE WORLD -

H. G. FISCHER & CO.

9451-91 W. BELMONT AVE. • FRANKLIN PARK, ILLINOIS

Printed in U.S.A.



ARMY E NAVY

H. G. FISCHER & CO.

FRANKLIN PARK, ILLINOIS

Manufacturers of high quality X-ray and electromedical equipment since 1910.

Holders of the U. S. Army-Navy "E" Award with three additional awards represented by the stars on the flag, and holders of the U. S. Navy Certificate of Achievement — all for outstanding services rendered.

This series of awards constitutes the most signal recognition granted any manufacturer of x-ray equipment.

Producing — in a new 82,000 sq. ft. factory — efficient, durable, attractive apparatus, which offers customers the greatest value per dollar expended obtainable in the entire industry.



A. H. Deering, Rear Admiral, MC, U. S. Navy, presenting Certificate of Achievement to A. W. Mathis, President, H. G. Fischer & Co. (Official U. S. Navy photograph.)

OVER 100,000 SATISFIED USERS THROUGHOUT THE WORLD



HOME OF H. G. FISCHER & CO.

Representative Units of the Complete Line of H. G. FISCHER & CO.

The complete H. G. FISCHER & CO. line includes many models of Modern X-ray apparatus (medical and dental), Short Wave Diathermy Units, Ultrasonic Units, Low Volt Generators, Thermo-Flo, Infra Red Generators, other apparatus, supplies and accessories. H. G. FISCHER & CO. has always maintained the policy of meeting or exceeding the standards of any competing units designed for the same purpose, regardless of price, and pricing all apparatus at the lowest point consistent with quality manufacture.

SINCE 1910, H. G. FISCHER & CO. has been one of the largest manufacturers of Shockproof X-ray and Electromedical equipment. Pioneers in the field of X-ray and Electromedical equipment, H. G. FISCHER & CO. is recognized throughout the world today for apparatus of dependable service and great durability. H. G. FISCHER & CO. is the ORIGINAL COMPANY. It has no connection with any other company having a similar name. No H. G. FISCHER & CO. equipment is manufactured outside of the Chicago area.

More than forty-four years of experience in engineering, design and construction of X-ray and Electromedical apparatus, together with fine workmanship and materials, are built into all H. G. FISCHER & CO. apparatus. The fact that today over 100,000 physicians, dentists, hospitals, clinics, universities and other medical organizations in the United States and throughout the world use H. G. FISCHER & CO. apparatus reflects its outstanding quality and service.

All H. G. FISCHER & CO. apparatus is serviced and sold through factory-trained representatives who are well qualified to render necessary technical assistance. Our comparatively small overhead expense and factory-trained representation enable us to give purchasers such value per dollar expended as cannot be excelled by any other manufacturer in the field.

The home of H. G. FISCHER & CO. is now conveniently located at 9451-91 W. Belmont Ave., Franklin Park, Illinois, a western suburb of Chicago (3200 North and 9400 West, by the Chicago numbering system). Doctors are cordially invited to visit the H. G. FISCHER & CO. plant, where modern X-ray and Electromedical equipment will be displayed and demonstrated. A visit entails no obligation.



De Luxe 69" 200 Milliampere X-ray Apparatus with Hand-Tilted or Motor-Driven Table.



"Multi-Service" 200 or 100 Milliampere X-ray Apparatus, Hand-Tilted or Motor-Driven Table.



MP 30 Milliampere Mobile-Portable Shockproof X-ray Apparatus.



100 Milliampere X-ray Unit with Urological Table.



Model "10A" Short Wave Diathermy Unit.



De Luxe Model "40D" Short Wave Diathermy Unit.



Multi-Purpose 100 Milliampere X-ray Apparatus With Multi-Purpose Tilt Table.



Spacesaver Radiographic-Fluoroscopic Unit and Examining Table, 30, 50, 75 Milliamperes.



Spacesaver Radiographic-Fluoroscopic Examining Table, 100, 200 Milliamperes.



Spacesaver Vertical Fluoroscope.



Ultrasonic Generator manufactured by H. G. Fischer & Co. newly in Franklin Park, Illinois.



TU 30, 50, or 75 Milliampere Shockproof X-ray Apparatus.

H. G. FISCHER & CO.

9451-91 W. BELMONT AVE. · FRANKLIN PARK, ILLINOIS

30M 5 56 Form 3125A

Printed in U.S.A.



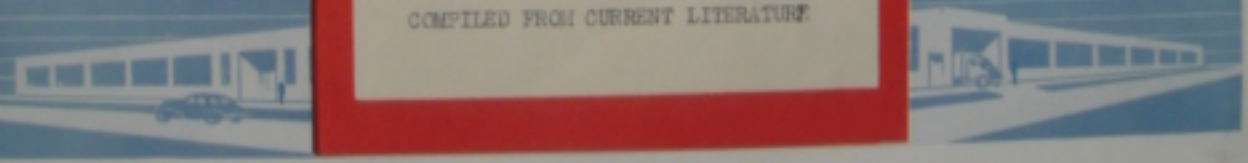



MODERN SHOCKPROOF X-RAY AND ELECTROMEDICAL EQUIPMENT

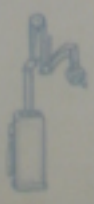
Distinguished for Outstanding Performance and Great Durability

LOW VOLTAGE THERAPY

COMPILED FROM CURRENT LITERATURE



H. G. FISCHER & CO.



TECA

one name for every need in low-volt therapy

You can always expect the important instrument developments to come from Teca . . . pioneers in the design of generators for low-volt therapy and electro-diagnosis. Teca units employ superior modern electronic circuitry, offer currents with minimal sensation . . . are unequalled for simplicity of operation, durability and efficiency. For complete details on the instruments shown, as well as utility units, hydro-electric, and special electro-diagnostic equipment, write today.

SP2 PORTABLE LOW-VOLT GENERATOR — affords complete flexibility in muscle stimulation and ion-transfer therapy — provides variable frequencies, variable surge rates and continuous DC. Effective stimulation with minimum sensation. Features simple operation . . . lifelong durability.

ELECTRO-DIAGNOSTIC INSTRUMENT CH3 (chronaxie, strength duration curves, R.D. Tests, etc.)—Eliminates tedious, time-consuming adjustments . . . affords complete operating simplicity and precision. Special new electronic control circuits (pat. pending) automatically compensate for instrument and patient variables . . . assures repeatable results!

SP5 TWO-CIRCUIT GENERATOR — compact, complete unit has impressive features found in larger Teca instruments—independent AC-DC or simultaneous use of both. Useful for denervated muscle treatment.

FOR THE SPECIALIST OR LARGE DEPARTMENTS
NEW IMPROVEMENTS – NEW FEATURES

CD4P TWO-CIRCUIT GENERATOR—Has AC and DC circuits . . . answers every low-volt therapy need. Provides pulse, sine and square stimulating current wave forms essential to a department using all phases of low-volt therapy.

CD7 TWO-CIRCUIT GENERATOR — the finest and most complete low-volt generator available.



New complete portable generator

New ease and precision in electro-diagnosis

Ideal for office or hospital

TECA CORPORATION

80 MAIN ST. • WHITE PLAINS, N. Y.

GENTLEMEN:

- ☐ Send information on Model _____
- ☐ Would like demonstration of Model _____
- ☐ Send Low-Volt Therapy Booklet

NAME _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

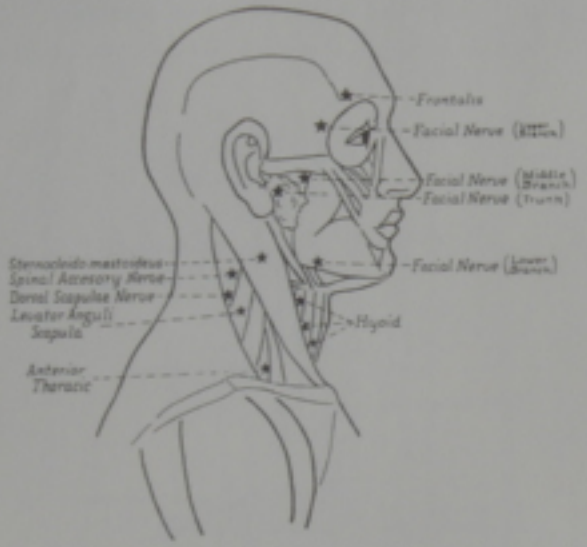
BY _____

Use and Explanation of the Fischer Electro-Diagnostic Charts

Galvanic and Contractile Currents Generators afford excellent means for making correct electrical diagnosis to determine the degree of paralysis and reaction of degeneration.

The following general rules must be observed.

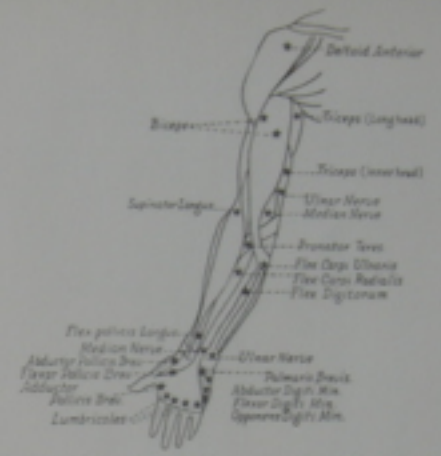
The principal requirement of this method is to localize the current of required density and strength upon parts of the body marked



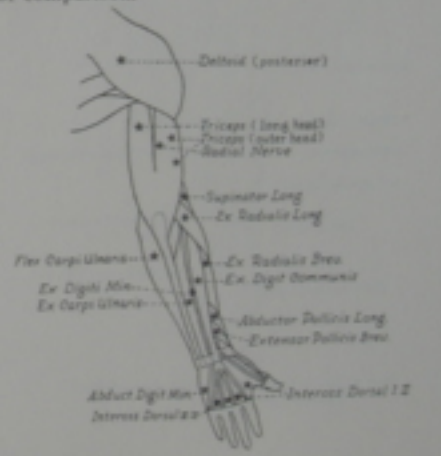
for investigation, avoiding as much as possible unnecessary excitation of the neighboring structures.

One pole or electrode only should be used for each muscle or nerve reaction expected, and while it is necessary to have a second electrode somewhere to complete the circuit, it is desirable to place this second electrode so as to eliminate effects at its point of contact. It is called the indifferent electrode. It should be much larger than the exciting electrode, which must be of the proper shape and size (usually one inch long by one-half inch wide) not to overlap adjacent tissue.

The operator should become fully familiar with his apparatus and practice by experimentation, possibly upon himself, so as to secure dexterity in manipulation. To secure accuracy in the interpretation of his results, it is advisable to test healthy parts, especially



if there is only one side of the body diseased, so that one may obtain a standard of comparison.



It should always be kept in mind that deeper and more pronounced contractions are obtainable by the pulsating direct current than the others. To determine the strength of the current to be used,



ULTRASONIC GENERATOR

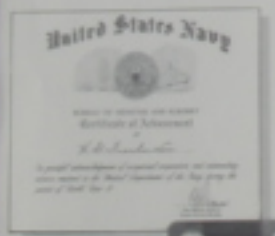
Manufactured for H. G. FISCHER & CO. exists in Franklin Park, IL. Maximum output of 50 Watts on 10 sq. cm. active crystal area. Complete information in Circular 5147. Ask for it.



UROLOGICAL X-RAY UNIT

100 Ma or 150 KVP

Meets all requirements of modern Urological Technic. All required settings and adjustments of Table easily made. Complete information in Circular 5150. Ask for it.





H. G. FISCHER & CO.
FRANKLIN PARK, ILLINOIS





MODEL "10A" SHORT WAVE DIATHERMY

F.C.C. Type Approval No. D-447

Powerful, low cost, portable
Highly efficient for condenser and applicatorode
Complete information in Circular 5116. Ask for it.

DE LUXE "400" SHORT WAVE DIATHERMY

A.M.A. Acceptance
F.C.C. Type Approval No. D-500
Canadian Type Approval No. 7
Underwriters' Laboratories Approval

Highest quality unit. Unexcelled performance in all types of short wave diathermy applications.
Complete information in Circular 5107. Ask for it.



LOW VOLTAGE GENERATORS
—Galvanic, Sinusoidal, Faradic
Ask for Descriptive Literature.

Inquire about our Low Prices and our Small Down Payment—Low Monthly Payments—Income While You Pay Plan.

FISCHER-NEWMAN THERMO-FLO

For the application of controlled heat to the pelvic area. Complete information in Circular 5145. Ask for it.

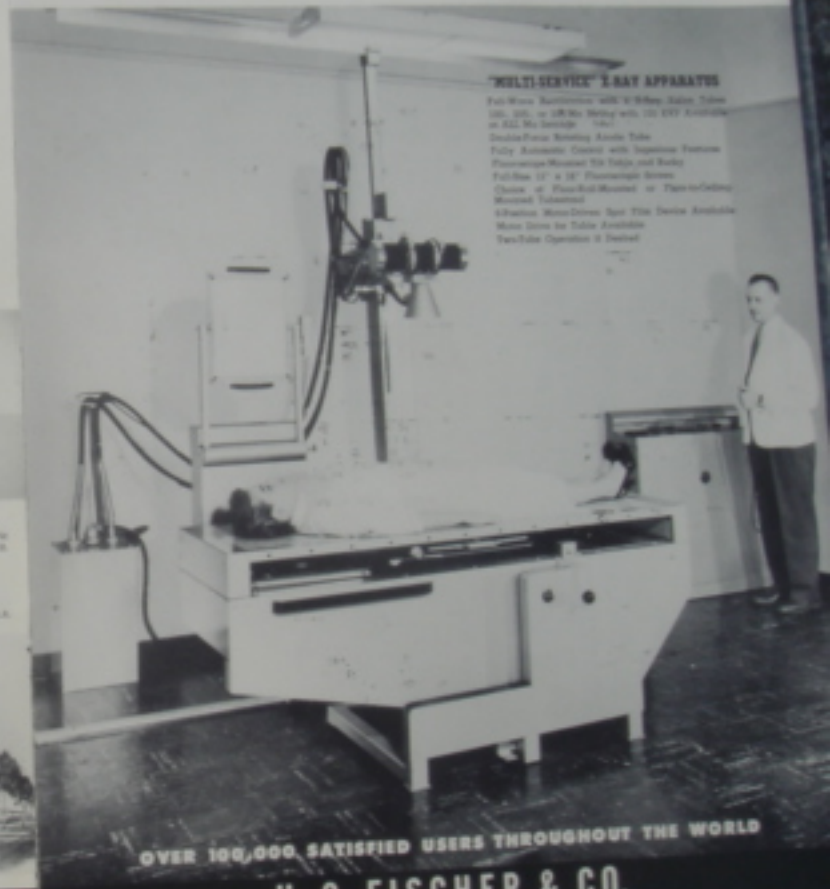
MANY OTHER MODELS NOT ILLUSTRATED HERE ALSO AVAILABLE

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H. G. FISCHER & CO.
9451-91 W. BELMONT AVE. • FRANKLIN PARK, ILLINOIS
Suburb of Chicago

High Quality X-Ray Units of Demonstrated Efficiency



OVER 100,000 SATISFIED USERS THROUGHOUT THE WORLD

H. G. FISCHER & CO.
ESTABLISHED 1907
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Suburb of Chicago



UNMATCHED IN HIGH QUALITY

Design, Efficiency, Workmanship, Materials

"MULTI-SERVICE" 100-MA X-RAY UNIT

Full-Wave Rectified or Self Rectified
"Multi-Service" or "Automechron" Control
Rotating or Stationary Anode Tube
Fluoroscopic-Mounted Stand-Tilt or Motor-Driven Table
Full Size 12" x 14" Fluoroscopic Screen
All Positions from Trendelenburg to Vertical
Choice of Floor-to-Ceiling or Floor-Rail Tubestand
Complete information in Circular 3148. Ask for it.



"SPACESAVER" VERTICAL FLUOROSCOPE

Minimum Output, 15 Milliamperes — 85 Peak Kilovolts
Fluoroscopic Rating, 5 Ma at 85 KVP

Minimum space required — Ideal for corner installation
Operates from regular 110-volt office lighting circuit
Controls mounted on side of panel frame
Two Meters, 1 for Ma, 1 for KVP, mounted on front
Built-in automatic ruby light eliminates installation of ruby light in ceiling. Provides just enough room illumination before fluoroscopy to position patient without use of ceiling lights. Ruby light goes out automatically when last switch is depressed for fluoroscopy, leaving room dark.
Full size 12" x 14" Screen centers with Tubehead
Tubehead and Screen counterbalanced for easy handling
Attractive hammered grey finish with mother-of-pearl panel
Complete information in Circular 3137. Ask for it.





MOBILE-PORTABLE X-RAY APPARATUS

Model MP-30: 30Ma at 74KVP — 5Ma at 90KVP

Large ball-bearing swivel casters facilitate movement of unit over door sills and in and out of elevators
Easily disassembled without tools for portability
101 steps of kilovoltage regulation, permitting thickness-of-part technic with 1 KVP regulation
Two meters—one for milliamperes and one for kilovolts. Kilovolt meter has three scales compensated for 5, 15, and 30 milliampere loads
Horizontal and vertical radiography. Fluoroscopy in both positions by using hand or operating fluoroscope
May be used with table, Bucky diaphragm, wall frame, or wall-mounted cassette holder
Complete information in Circular 3097. Ask for it.

"SPACESAVER" FEATURES

Common to All Units

Radiographic-Fluoroscopic Unit and Examining Table
Minimum floor space
Radiography and Fluoroscopy in both horizontal and vertical positions
Easy change from horizontal Fluoroscopy to Radiography or vice versa, without moving patient from table
Standard Bucky diaphragm travels full length of cabinet
Full size 12" x 14" Fluoroscopic Screen

"SPACESAVER" 30 MA

30 Ma at 74 KVP — 5 Ma at 90 KVP
Self-Contained Tubehead
101 Steps of Kilovoltage Regulation
Control Mounted on Cabinet
Complete information in Circular 3100. Ask for it.

"SPACESAVER" 50 MA

50 Ma at 80 KVP — 5 Ma at 90 KVP
Self-Contained Tubehead
Single-Focus Tube
"Automechron" or Type "S" Control
Complete Information in Circular 3134. Ask for it.

"SPACESAVER" 75 MA

75 Ma at 75 KVP — 5 Ma at 90 KVP
Self-Contained Tubehead
Double-Focus Tube
"Automechron" or Type "S" Control
Complete Information in Circular 3134. Ask for it.

"SPACESAVER" 100 MA

Full-Wave Rectified with 125 KVP available at ALL Ma Settings, or Self-Rectified Rated 100 Ma at 85 KVP — 5 Ma at 90 KVP.
"Multi-Service" or "Automechron" Control
Rotating or Stationary Anode Tube
Complete Information in Circular 3130. Ask for it.

"SPACESAVER" 200 MA

Full-Wave Rectified
200 Ma Rating with 125 KVP available at ALL Ma Settings
"Multi-Service" or "Automechron" Control
Rotating Anode Tube
Complete Information in Circular 3130. Ask for it.









ULTRASONIC GENERATOR

Manufactured by H. G. FISCHER & CO., situated in Franklin Park, Ill. Maximum output of 50 Watts on 10 mc. with active crystal area. Complete information in Circular 3142. Ask for it.



LOW VOLTAGE GENERATOR

For Muscle Stimulation, Ion-Transfer Therapy, Medical Galvanism, Muscle and Nerve Testing. Ask for literature.



FISCHER-NEWMAN THERMO-FLO

For the Application of Controlled Heat to the Pelvic area. Ask for circular 3140.



DE LUXE "400" SHORT WAVE DIATHERMY

A.M.A. Acceptance
F.C.C. Type Approval No. D-555
Canadian Type Approval No. 7
Underwriters' Laboratories Approval

Highest quality unit. Unexcelled performance in all types of short wave diathermy application.
Complete information in Circular 3137. Ask for it.



MODEL "10A" SHORT WAVE DIATHERMY

F.C.C. Type Approval No. D-457
Canadian Type Approval No. 11

Powerful, low cost, portable
Highly efficient for condensers and applicators
Complete information in Circular 3118. Ask for it.





ARMY E NAVY

H. G. FISCHER & CO.
FRANKLIN PARK, ILLINOIS

Manufacturers of high quality X-ray and electromedical equipment since 1912.

Holders of the U. S. Army-Navy "E" Award with three additional awards represented by the stars on the flag, and holders of the U. S. Navy Certificate of Achievement — all for outstanding services rendered.

This series of awards constitutes the most signal recognition granted any manufacturer of x-ray equipment.

Producing — in a new 50,000 sq. ft. factory — efficient, durable, attractive apparatus, which offers customers the greatest value per dollar expended obtainable in the entire industry.

OVER 100,000 SATISFIED USERS THROUGHOUT THE WORLD

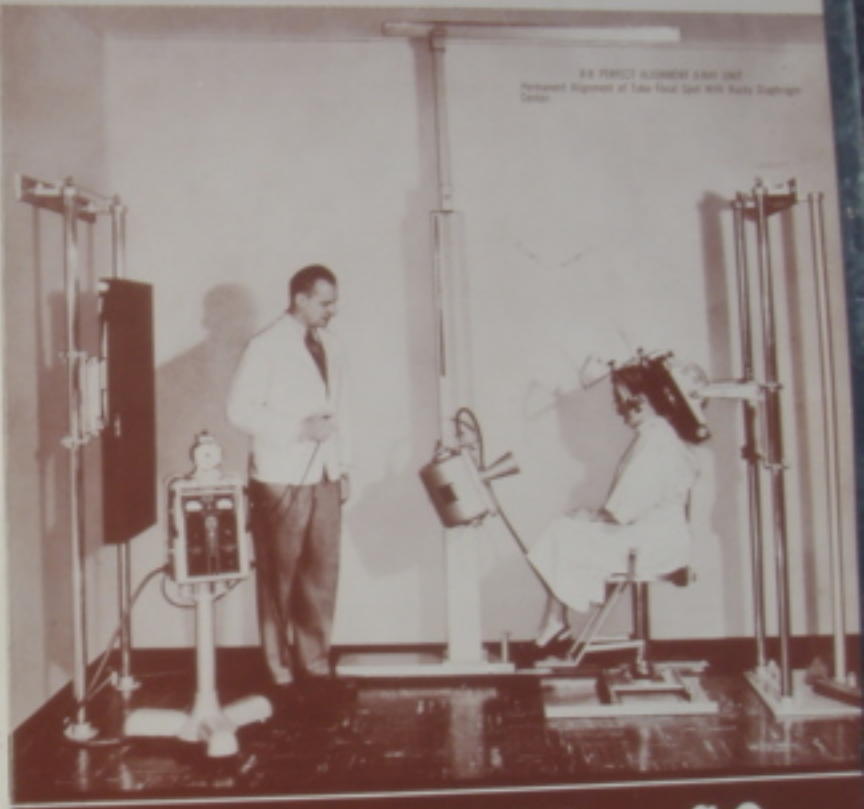
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9451-91 W. BELMONT AVE. FRANKLIN PARK, ILLINOIS

H. G. FISCHER & CO.

SPECIALIZED X-RAY EQUIPMENT FOR CHIROPRACTORS

Cervical Spine Radiographs at 42" — Full Spine Radiographs at 60"



H. G. FISCHER & CO.

Modern Shockproof X-ray Apparatus

FRANKLIN PARK, ILLINOIS (Suburb of Chicago)







FISCHER SPECIALIZED X-RAY EQUIPMENT FOR CHIROPRACTORS

FISCHER specialized x-ray equipment for Chiropractors affords a high degree of radiographic precision to meet the requirements of modern technics and the insistence by the profession for improved radiographic results.

CERVICAL SPINE RADIOGRAPHS

Among the various models of x-ray apparatus are units especially designed to accomplish all accepted Chiropractic Technics. The Wall Frame Mounted Tilting Bucky, the Turntable Chair and the Head Clamp are accessory items generally considered essential for most cervical technics. The Bucky diaphragm is counterweighted, moves easily over the full length of the frame and locks in any position. It can be tilted at any desired angle. The Turntable Chair permits easy positioning without any effort on the part of the patient.

FULL SPINE RADIOGRAPHS

For full spine radiographs FISCHER offers a Wall Frame Tilting Bucky Stand with 36" counter-weighted Bucky which moves easily over the full length of the frame and locks in any desired position. This Bucky can be tilted to conform to body distortions caused by spinal abnormalities, thus affording closer approximation of the patient to the film. Distortion on the film is reduced and detail is improved. A special FISCHER Cervical Blocker is available for equalizing radiographic densities over the entire spine.

RADIOGRAPHIC TABLES

H. G. FISCHER & CO. manufactures two types of high quality radiographic tables. The Hand-



Tilt on Motor-Driven Tilt Table in the deluxe class, and the Horizontal Roentgenographic Table in the low-price class.

H. G. FISCHER & CO. has designed more x-ray equipment especially for the use of Doctors of Chiropractic than any other manufacturer and is enjoying the industry's most widespread patronage from the Chiropractic Profession.

Among the prominent Chiropractic Colleges now using and recommending H. G. FISCHER & CO. X-Ray Equipment are the Palmer School of Chiropractic, Davenport, Iowa; the Logan Basic College of Chiropractic, St. Louis; the National College of Chiropractic, Chicago; the Los Angeles College of Chiropractic; and the Chiropractic Institute of New York.

ALL FISCHER X-RAY UNITS HAVE THE UNDERWRITERS' LABORATORIES APPROVAL

Send for Illustrated Literature on FISCHER Units of Interest.

Inquire about our Low Prices and our Small Down Payment—Low Monthly Payments—Income While You Pay Plan.









CATALOG • NUMBER 38

SHOCKPROOF X-RAY APPARATUS

ACCESSORIES AND SUPPLIES

• QUALITY-BUILT

H. G. FISCHER & CO.

2323-2345 WABANSIA AVE. • CHICAGO

Manufacturers of

X-RAY AND ELECTRO-SURGICAL-MEDICAL EQUIPMENT

• SATISFACTORY PERFORMANCE GUARANTEED


H. S.
Fischer
& CO.
CHICAGO, ILL.



Home of H. G. FISCHER & CO., 2323-2345 Wabansia Ave., CHICAGO, ILLINOIS

The Complete FISCHER Line

The complete FISCHER Line includes many models of shockproof X-Ray Apparatus (Medical and Dental), Short Wave Units, Galvanic and Contractile Currents Generators, Ultra Violet and Infra-red Generators, other Apparatus, Supplies and Accessories. The FISCHER manufacturing policy requires first that every piece of FISCHER equipment shall equal or exceed in performance every competing unit designed for the same purpose, regardless of price. Second, the unit itself must be priced at the lowest point consistent with quality manufacture.

FISCHER Dental X-Ray Apparatus



FISCHER Wall-Mounted Shockproof Dental X-Ray Unit

A HIGHEST-QUALITY apparatus, embodying every advanced feature of mechanical and electrical construction. Designed for wall-mounting only. Among outstanding features are the following:

1. This unit is absolutely shockproof throughout. No exposed wiring.
2. It is 100% flexible. All positions easily and instantly obtainable while patient remains seated in the dental chair.
3. Power is more than ample and radiographic results are excellent.
4. Control is very fine. Angles can be reproduced.
5. Construction is very compact. Only the finest materials are used. Tube and transformer housed in one-piece drawn steel tank.
6. Optional finish—ivory tan or mahogany.

No.	*	Code
4485	FISCHER Wall-Mounted Shockproof Dental X-Ray Apparatus	TIBRS

Ask for descriptive pamphlet Form 1569

FISCHER Mobile Shockproof Dental X-Ray Unit



THIS apparatus differs from the FISCHER Wall-Mounted unit only in the method of mounting. Mobility is provided by free-rolling casters. The pedestal is sturdy and free of vibration. Features of structure-operation are the same as for the wall-mounted model.

1. This unit is absolutely shockproof throughout. No exposed wiring.
2. It is 100% flexible. All positions easily and instantly obtainable while patient remains seated in the dental chair.
3. Power is more than ample and radiographic results are excellent.
4. Control is very fine. Angles can be reproduced.
5. Construction is very compact. Only the finest materials are used. Tube and transformer housed in one-piece drawn steel tank.
6. Optional finish—ivory tan or mahogany.

No.	*	Code
4488	FISCHER Mobile Shockproof Dental X-Ray Unit	TIEPI

Ask for descriptive pamphlet Form 1509



FISCHER Model "S" Short Wave Apparatus

Permits choice of 6-meter or 12-meter wave length. Available (1) with chassis mounted in portable case in cabinet; or (2) with chassis mounted directly in cabinet; or (3) portable section only may be purchased. Naturally the different arrangements have different catalog symbols.

FISCHER Model "S" Short Wave Apparatus is a four-tube unit. The tubes are exceptionally powerful and durable. The entire apparatus is constructed of the very finest materials. Flexibility is a marked feature—applications may be made with the inductance disc, which is regular equipment, or with the inductance cable or condenser cuff, pad or insulated orificial electrode. Air-spaced electrodes are available as shown. Performance is backed by the usual strong FISCHER guarantee. Below is given a list of the outstanding features of structure-operation.



Features of STRUCTURE-OPERATION

1. POWER. Whether the area to be heated is large or small, close or joint, or more inclusive body parts this unit will give superb results.
2. TUBES. FISCHER Model "S" is a four-tube unit. The tubes are of special heavy design and are exceptionally efficient. Performance is notably superior and the tubes are more durable.
3. PATIENT'S OUTLETS. There are six patient's outlets, four for condenser electrodes or air-spaced electrodes and two for the inductance disc or inductance cable. The three potentials afforded by the four condenser electrode outlets are a special feature in FISCHER models.
4. CONTROLS. The main volume control operates in connection with the auxiliary volume control. Control is fine, making it possible to apply power to the patient at any level from zero to maximum.
5. DURABILITY. FISCHER Model "S" is designed and constructed to give a lifetime of efficient service.
6. ELECTROSURGICAL CURRENTS. Such modern technics as electro-coagulation and electro-surgical tissue cutting are available. The various electrodes plug directly into patient's outlets.
7. OPTIONAL FINISH. FISCHER Model "S" is available in two-tone walnut or in plain ivory.

No.	*	Code
4420	FISCHER Model "S"—12 meters—(chassis mounted in portable case in cabinet) complete with flexible arm, and inductance disc, also 2 condenser pad electrodes (5½" x 8½")	TIALW
4422	FISCHER Model "SP"—12 meters—portable section only with inductance cable (including separator blocks) and 2 condenser pad electrodes (5½" x 8½")	TIANO
4520	FISCHER Model "S"—6 meters—(chassis mounted in portable case in cabinet) complete with flexible arm and inductance disc, also 2 condenser pad electrodes (5½" x 8½")	TIAOE
4522	FISCHER Model "SP"—6 meters—portable section only with inductance cable (including separator blocks) and 2 condenser pad electrodes (5½" x 8½")	TIAST
4516	FISCHER Model "SC"—12 meters—(chassis mounted directly in cabinet) complete with flexible arm, inductance disc and 2 condenser pad electrodes (5½" x 8½")	TIJVE
4518	FISCHER Model "SC"—6 meters—(chassis mounted directly in cabinet) complete with flexible arm, inductance disc and 2 condenser pad electrodes (5½" x 8½")	TIJTG

Ask for descriptive pamphlet Form 1862

FISCHER Model "A" Short Wave Apparatus



Available (1) with chassis mounted in cabinet or (2) with chassis mounted in portable case in cabinet, or (3) portable section only may be purchased.

FISCHER Model "A" Short Wave Apparatus is a single tube unit, designed to meet the varying needs of physicians, hospitals, clinics. Model "A" has the chassis mounted directly in the cabinet. When chassis is mounted in portable case in cabinet, this apparatus is catalogued as Model "PAC". The portable section only, that is, without cabinet, is catalogued as Model "PA". The inductance disc is regular equipment except with the portable section only (Model "PA") which prevents mounting. Applications may be made also with the inductance cable, condenser cuff, pad, and insulated orificial electrodes. Air-spaced electrodes can be supplied and attached as shown. Below is given a list of the more important features of structure-operation.

Features of STRUCTURE-OPERATION

1. POWER. Whether the region to be heated be large or small, sinus, joint or more inclusive body part, this unit gives excellent results.
2. WAVE LENGTH. FISCHER Model "A", also Models "PA" and "PAC", have a wave length of 32 meters.
3. TUBE. Unusually efficient. Has extreme ruggedness and ability to stand up under tremendous service.
4. PATIENT'S OUTLETS. There are six patient's outlets, four for condenser electrodes or air-spaced electrodes and two for the inductance disc or inductance cable. The three potentials afforded by the four condenser electrode outlets are a special feature.
5. CONTROLS. The main volume control operates in connection with the auxiliary volume control. It is possible to apply power to the patient at any level up to maximum.
6. FLEXIBILITY OF APPLICATION. Not only all types of applications but applications with all types of electrodes are possible with Models "A" and "PAC". Model "PA" does not permit use of universally flexible arm or applications with inductance disc or air-spaced electrodes.
7. ELECTROSURGICAL CURRENTS. Such modern technics as electrocoagulation and electrosurgical tissue cutting are available.
8. VENTILATION. This is provided at top of cabinet and at back. Ample ventilation is necessary, when a unit operates for long periods, to prevent tube from overheating.
9. ADVANCED CONSTRUCTION. Only the finest materials are used. Construction is of the chassis type. Large storage space.
10. FINISH. Cabinet is two tone walnut. Metal parts are chromium plated. The portable section is in black kristekrack.



No.		Code
50	FISCHER Model "A" (chassis mounted directly in cabinet)—complete with flexible arm, inductance disc and 2—5½" x 8½" electrodes	TIJMO
52	FISCHER Model "PAC" (chassis mounted in portable case in cabinet) complete with flexible arm, inductance disc and 2—5½" x 8½" electrodes	TIJVB
53	FISCHER Model "PA" (portable section only) complete with inductance cable and 2—5½" x 8½" electrodes	TIJBK

Ask for descriptive pamphlet Form 1926

FISCHER Model "B" Ultra Short Wave Unit

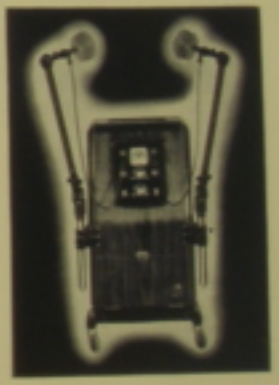


This is a two-tube apparatus giving highly efficient performance. The chassis is mounted directly in the cabinet.

FISCHER Model "B" Ultra Short Wave Unit is distinguished by two features: (1) it is an all-service apparatus producing excellent results; (2) it is remarkably low in price. This unit will provide every service needed in short wave diathermy. Applications may be made with the inductance disc, which is regular equipment, or with the inductance cable or condenser cuff, pad or insulated orificial electrodes. Air-spaced electrodes can be supplied and attached as shown. Only the finest materials are used in construction. Performance is backed by the usual strong FISCHER guarantee. Below is given a list of the more important features of structure-operation.

Features of STRUCTURE-OPERATION

1. POWER. Whether the region to be heated be large or small, sinus, joint or more inclusive body part, power is ample.
2. TUBES. Two tubes of special design are used in FISCHER Model "B". There is low loss of energy and accordingly highly efficient performance.
3. PATIENT'S OUTLETS. There are six patient's outlets, four for condenser electrodes and two for the inductance disc or inductance cable. The three potentials afforded by the four condenser electrode outlets are a special feature. Outlets for the inductance cable are larger and prevent cable being plugged into wrong outlets.
4. CONTROLS. The main volume control operates in connection with the auxiliary volume control. It is possible to apply power to the patient at any level up to maximum.
5. ELECTROSURGICAL CURRENTS. Such modern technics as electrocoagulation and electrosurgical tissue cutting are available.
6. VENTILATION. This is provided at top of cabinet and at back. Ample ventilation is necessary, when a unit operates for long periods, to prevent tubes from overheating.
7. FINISH. Cabinet is two-tone walnut. It has a beautiful hand-rubbed finish. Metal parts are chromium plated.



No.		Code
9665	FISCHER Model "B" including inductance disc and universally flexible arm, also two 5½" x 8½" pad electrodes	TIKON
9664	FISCHER Model "B" less accessories, that is, without inductance disc, flexible arm and the two pad electrodes	TIKPL
4434	Extra Supporting Arm, should two arms be desired for air-spaced electrodes	TERAC
4444	Single Air-Spaced Electrode—consisting of electrode body, 4" disc, 2" disc and connecting cord	TECAA

Ask for descriptive pamphlet Form 1928

FISCHER Model "CK" Ultra Violet Generator
FISCHER Model "K" Ultra Violet Generator



FISCHER Ultra Violet Generators are made in two models—FISCHER Model "CK" and FISCHER Model "K". In FISCHER Model "CK", the grid burner has two parallel burner tubes, one of pure quartz and one of corex. A three-way switch permits operation of either the quartz or the corex burner separately, or both may be operated together. In FISCHER Model "K", there is only one burner tube of pure quartz. Other parts of the apparatus are identical.

FISCHER Ultra Violet Generators are compact, attractive, mobile—mounted on free-rolling casters. Note low transformer giving great stability. The reflector is highly polished, backed by moulded bakelite. The cross-arm is instantly adjustable. The upright may be extended to 60". A spring in the upright prevents cross-arm and reflector from jar and possible damage, should it be accidentally released or dropped during adjustment. There is an automatic timer in the transformer housing, also plus-lined pocket for holding and protecting orificial burner. The design of the grid-burner reflector assures even distribution of the ultra-violet rays over body surfaces. Naturally output is instant—there is no waiting before application can be made—an important saving of time.



Features of STRUCTURE-OPERATION

1. FISCHER Ultra Violet Generators embody every modern and approved feature of design, efficiently meeting every need for both surface and orificial application.
2. The energy output is more than sufficient for all application needs. Output also remains constant—does not diminish with use of the burners.
3. The quartz burner produces rays ranging from 1849 to 3,900 AU, with greatest intensity of output around 2,550 AU. Radiation from the corex tube or burner differs only in that some of the shorter rays are cut off, greatest intensity of output being around 3,200 AU.
4. FISCHER Ultra Violet Generators afford complete ultra violet therapy. There are two burners, the grid-type for skin or surface applications and the orificial burner for orificial applications.
5. Patient and operator are singularly safe. There is no possibility of electric shock nor danger from hot mercury should a burner become accidentally broken.
6. An outstanding advantage is the saving of time in making applications. Treatment can begin the instant the electric current is turned on. The ample output effects shortened treatment periods.
7. Finish is optional—black or hammered gray. Ivory also available. Various metal parts in chromium.

No.		Code
4368	FISCHER Model "CK" UltraViolet Generator including grid and orificial burners, also one pair of goggles	TIRDA
4370A	FISCHER Model "K" UltraViolet Generator including grid and orificial burners, also one pair of goggles	TATXX

Ask for descriptive pamphlet Form 1932



FISCHER Mod
Galvanic and C
Currents Gen

A GALVANIC and contractile curr
the most widely indicated and
units of electrotherapeutic appar
Model "J" Generator meets every
ed both by finest performance and

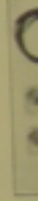
FISCHER Model "J" Galvanic
Generator produces all the low volt
authorities. The galvanic current is
tractile currents exact as to wave
exact as long as the apparatus is
patented flat commutator. Control is
parably in advance of control in
wanted are selected by simply turni
switches to the proper numbers.
galvanism, common ion transfer,
generator will give wholly satisfac

ACCESSORIES

View above shows new FISCHER Model "J" Galvanic and Contractile Currents Generator. View right shows accessories included with generator—connecting cords, electrodes and handle. Among special features to be emphasized are the following: The current chart on the control panel, giving keys to currents wanted, the quick-reading meters, the slip-proof patient's outfits, the silent operation of the unit. Construction is in every way highest quality. The cabinet is all-steel. A choice of finishes is offered—black Kristokrak, hammered gray, or ivory.

No.		Code
4301	FISCHER Model "J" Galvanic and Contractile Currents Generator with Connecting Cord and Accessories as listed above	TATAB

Ask for descriptive pamphlet Form 1036A



FISCHER Galvanic Current G

THE extreme importance of the galvanic current in the practice of modern medicine is recognized by the majority of physicians of today, in gynecology, urology, etc., for depilatory work, ionization, rectal lesions, electrolysis, strictures, etc. The outstanding features of this unit are: perfect smoothness of the current; a galvanic output comparable to that of a battery source absolutely without fluctuation; noiseless operation; a polarity switch for pole-changing; a pilot light; black kristokrak finish. The current volume is controlled down to 1/25th part of a milliampere. This means that with this apparatus you can employ galvanism for all of its varied uses without any jerky or painful sensations, a value which will be apparent at once to the physician.



No.		
2552	Improved Galvanic Current Generator only (A. C.)	
2553	Special Stand for No. 2552	

Ask for descriptive pamphlet Form 1007.

Fischer Accessories

H·G·Fischer & Company Inc.
Physiotherapy Headquarters
2333-43 Wabansia Avenue
Chicago, Illinois

FISCHER

PHYSIOTHERAPEUTIC *and* X-RAY SUPPLIES *and* ACCESSORIES

Catalog No. 16
January 1926

H. G. FISCHER & COMPANY, INC.
Physiotherapy Headquarters
2333-43 Wabansia Avenue
Chicago, Illinois

Form 818

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The FISCHER PLANT

Home of Fischer Quality and Service

Conveniently Accessible
From All Parts of the City

DRIVING—Follow Washington Blvd. to Oakley Blvd., north on Oakley to Wabansia Ave. and one block west, or

BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont, or

BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

Visitors Are Always Welcome!

Foreword

IN presenting this, the 16th edition of our Accessory Catalog, we wish to call special attention to the many additions and changes that have been made. This catalog supersedes all former issues. It shows our full line of accessories, and renders obsolete all former illustrations, prices and description. No prices are given, but periodical price lists are issued to keep step with market fluctuations and the rise and fall of consequent costs.

We believe that our successful growth has been largely due to the rigid policies which we adopted at the outset—up-to-date manufacturing equipment, fair selling prices, guaranteed shipments, an adequate Service Department, and the ever present desire to "play square."

How to Order Always use a separate sheet on which to write your order, and write it on *one* side only. *Avoid* including it in the wording of your letter. This hastens the correct filling of your order. Use catalog numbers and write plainly, and when ordering by telegraph use *Code* words as they designate to us exactly what is desired, and save you expense in the message as well.

State clearly whether your machine is to be operated on the Direct or Alternating Current. If on D. C., give Voltage; if on Alternating, give Voltage and Cycle. Obtain this information from a reliable source: preferably from your electric power station.

When order does not give shipping instructions we will send via the cheapest or most direct route. Articles of light weight will be sent by Parcel Post to expedite delivery wherever possible.

Damage to Goods in Transit Our responsibility ceases when goods are receipted for by the express freight carrier, agent or Post Office, and we cannot be held responsible for breakage during transit, and if claim has to be filed for damaged goods, such claim should be filed by the consignee against the Transportation Company.

Return of goods by parcel post should always be insured so the shipper is protected in case parcels are lost.

As soon as it is found that goods are received in a damaged condition the carrier's agent should at once be notified and have the damaged goods inspected.

Neglect in complying with this rule places the responsibility entirely with the consignee in case claim is refused.

The Kolischer Spark Gap



A vast improvement over any other type of Spark Gap ever devised for any high frequency machine.

This "Kolischer" Gap will fit the supports on any Fischer or Thompson-Plaster Styles "F" and "F-O" machines, as well as the Types "L," "L-O" and "Military" models without alterations or other attachments.

This new Multiple Spark Gap is equipped with 16 Tungsten spark interrupter points, adequate copper flanging to carry away all heat, and individual control for each set of tips as well as master controller for simultaneous adjustment. Quiet, perfect control is possible at any voltage or milliamperage, more constant discharge obtained at any setting, and the regulation is gradual—as compared to the usual jumps—the utmost in utility and flexibility.

No.		Code
1222	Kolischer Spark Gap	*Kolgap*

The Baumanometer

An instrument of precise accuracy for measuring blood pressures. Especially valuable in connection with d'Arsonval Auto-condensation treatments.

No.		Code
436	Desk Model	*Baumon*
437	Kit-Bag Model	*Bankit*
438	Pocket Model	*Bapock*
439	Wallboard Model	*Banwall*



No. 436



Electrolytic Salt

Specially prepared for electrolytic purposes; one package of ½ pound makes proper and full charge for our No. 615 Leyden Jar, illustrated on page 33.

No.		Code
879	½ lb. package	*Leysal*

The Hawkeye Timer



Registers the length of any treatment exactly. A wonderful aid to accurate timing, particularly valuable when the physician is treating more than one patient at a time. The Hawkeye rings an alarm at the exact moment treatment should end. Should be in every diathermy and quartz light treatment room.

No.		Code
460	Hawkeye Timer	*Vestry*



Leyden Jars

Designed for use with our Types "FO," "LO" and Military High Frequency generators. Made of best quality glass, carefully coated.

No.		Code
615	Leyden Jar, complete as illustrated (1 qt. size)	*Hydat*
616	Leyden Jar, less Top and Carbon (1 qt. size)	*Laurel*

Breuer Safety Switch



The terminals of this switch are made to fit the foot switch openings on all Fischer Diathermy Outfits. The switch operates with a pull cord, just like an electric light socket, so that either the physician or the patient may turn the current on or off in a moment. This switch gives patients a feeling of perfect safety.

No.		Code
86	Breuer Safety Switch, complete with insulated pull cord	*Varier*

Fischer X-Ray Meters



No. 446



No. 447

No.		Code
445	Meter calibrated from 0 to 15 M. A.	*Extyer*
446	Meter calibrated from 0 to 60 M. A.	*Extobe*
448	M. A. Meter calibrated from 0 to 15 (High Frequency)	*Eurot*
458	Spark Meter, as used on the Fischer "2B" X-ray Transformer	*Exspar*

Fischer Coolidge Ammeter

Code

The Fischer Combination Electrophysiotherapeutic Treatment Outfit—Style "FO" Senior



A handsome, impressive piece of office equipment, compact, simple in operation yet the most powerful machine of its type available, and capable of the finest kind of results.

No.	Code
1230	*Nigres*

Ask for pamphlet Form No. 430

* * *



The Fischer Type "LO" Senior High Frequency Diathermy Apparatus

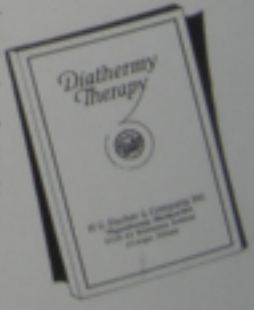
Designed especially for those physicians who are concerned with the specific application of medical and surgical diathermy (electro-coagulation), D'Arsonval auto-condensation and monopolar high frequency currents, but who have no desire for motor and pump features.

No.	Code
1232	*Nimble*

Ask for pamphlet Form No. 430

* * *

"Diathermy Therapy"



The Text Book of Diathermy. 118 pages, beautifully bound in Kroydon cover, copiously illustrated. Gives full information on Medical and Surgical Diathermy, Monopolar Desiccation, Autocondensation, High Frequency. Also indications and treatment for the various diathermy applications. The latest practice of leading physiotherapeutists, compiled for the benefit of the physician and surgeon who employs diathermy. Form No. 535A. Price, $1.00.

The Fischer Portable Diathermy and Electrocoagulation Apparatus, Type "GP"



This unit is built into a black leatherette covered carrying case, with closed lid, making it in every sense a "portable" apparatus. While this is a very effective office machine, it is more adapted to bedside work.

No.	Code
1245	*Tacit*

Ask for descriptive pamphlet Form No. 451

* * *



The Fischer Portable Diathermy and Electrocoagulation Apparatus, Type "G"

This unit is built into a handsome solid walnut case, with glass top. Designed especially for the operating room or at the bedside. Equally valuable for both medical and surgical work.

No.		Code
1250	Without Cart No. 1255	*Taney*

Ask for descriptive folder Form No. 451

* * *

The Fischer Portable Diathermy and Electrocoagulation Apparatus, Type "G"

No.		Code
1251	Mounted on Walnut Cart No. 1255	*Tancy*



No physician's office, no hospital or sanitarium is complete without some good physiotherapy equipment — particularly a diathermy apparatus of the portable or semi-portable type. Such a machine is a very decided requisite if modern methods of medicine and surgery are to be employed.

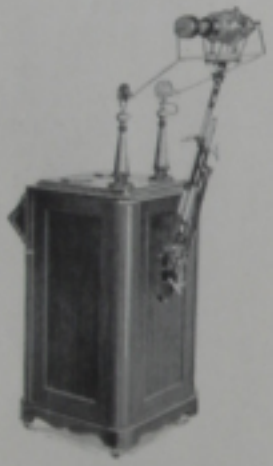
Ask for descriptive folder Form No. 451



The Fischer Type "S" 30 Milliampere Coolidge Radiographic Unit

No.		Code
1225	Capacity, 30 M. A. at a 5-inch gap	*Mater*

Ask for pamphlet Form No. 353



The Fischer Type "R" Coolidge Radiographic Unit

No.		Code
816	Capacity, 10 M. A. at a 5-inch gap	*Rexra*

Ask for pamphlet Form No. 371



The Fischer Improved Interrupterless X-Ray Transformer Type "2-B"

No.		Code
805	Capacity, 60 M. A. at a 6-inch gap	*Vacate*

Write for pamplet Form No. 341

The Fischer Galvanic Current Generator



No. 1200 — Code *Galvan*

The extreme importance of the galvanic current in the practice of modern medicine is recognized by the majority of physicians of today, in gynecology, urology, etc., for depilatory work, ionization, rectal lesions, electrolysis, strictures, etc., etc.

Ask for descriptive pamphlet Form No. 524

The Fischer Portable Galvanic Current Generator, Battery Type



No. 1190 — Code *Vesper*

This battery-operated Generator is convenient for use in localities where electric light current is not available. Some physicians prefer it for all galvanic treatments, because the battery current is absolutely steady, without even the minutest interruptions, and is especially desirable where extremely fine milliamperage is used.

Ask for pamphlet Form No. 818



The Morse Wave Generator, Type A-25

No. 1915 — Code *Ulema*

The Type A-25 Morse Wave Generator marks a new epoch in sine wave and galvanic apparatus construction; a new method of producing alternating current of a frequency much higher than heretofore employed in sine wave or sinusoidal apparatus, and caused to surge by a mechanical device to produce involuntary exercise of muscle tissue of the body.

Ask for bulletin No. A-25

The Fischer "Superior" Radiant Therapy Lamp

No.	Code
1295	*Firrap*

Medical literature abounds in reports of the desirability of light therapy in many conditions. There come to the mind of the progressive physician many instances where it is indicated as a curative, or a valuable adjunct and alleviative. The logic of light stands out pre-eminently.

Send for descriptive pamphlet Form No. 674





The Alpine Sun Lamp

No.	Code
1400	*Meiny*

Following our policy, this new model Alpine Sun Lamp is the outcome of observations and careful studies made of the use of the quartz lamps in the hands of the physicians. This apparatus is so constructed that it increases the efficiency of such work, making it more convenient to manipulate, and more durable.

Send for descriptive pamphlet



Combination Unit—Alpine Sun and Kromayer Lamps

No.	Code
1422	*Midst*

By far the greatest effect of the sun's rays is due to the ultra violet, but a more intense producer of ultra-violet rays is the quartz lamp. Here the rays are always available, always constant, and can be administered in quantity to give the desired results.

Both the Alpine Sun and Kromayer Lamps are producers of ultra-violet rays, that give the maximum intensity for therapeutic procedure.

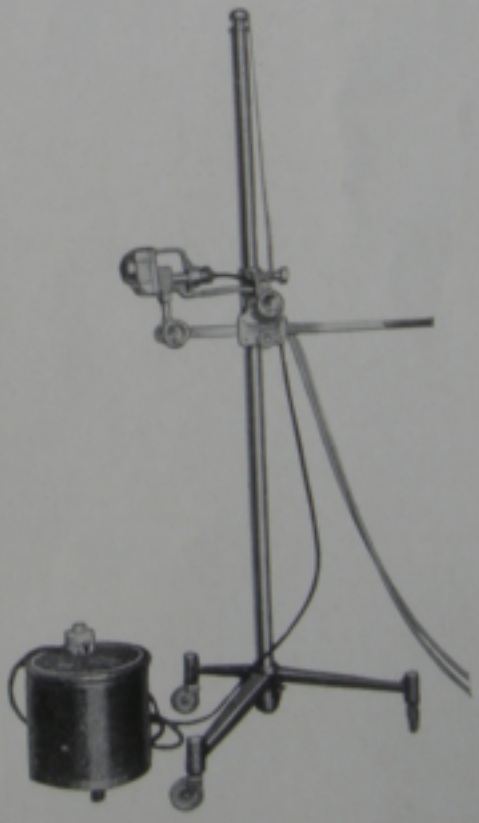
Send for descriptive pamphlet

The Kromayer Ultra-violet Lamp

No.	Code
1418	*Micro*

This type presents a convenient and intense source of ultra-violet rays, with features and ability to function, far surpassing any other apparatus of similar purport.

Send for descriptive pamphlet



H. G. Fischer & Co., Inc.

Order Form

In ordering please be sure to specify names and catalogue numbers of articles wanted, also sizes, etc., and use code number if order is telegraphed.

Ordered by_____

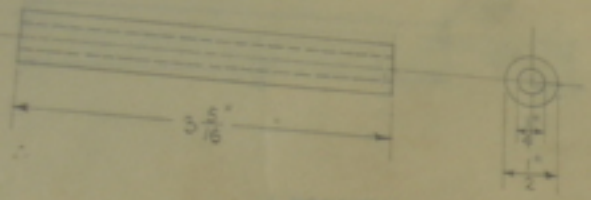
Address_____

City_____ State_____

(In placing first order it is generally best to send cash with order or have goods come C. O. D.)

Also send the following literature:


S-A Sizes
BANKERS BOX
701



1 REQUIRED

9-17-75

	ISSUE 1-30-60	IE	TITLE: WALL MODEL DENTAL X-RAY UNIT- TRANSF. SUPPORT ARM BUMPER
	CHANGED		
	"		
	"		
	"		
	"		

H. G. FISCHER & CO. 3300 WABANSIA AVE. CHICAGO, ILL. | CAT. NO. | PART NO. 12136

DRAW DOWN FROM 5/16 DIA.

5/16

5/16

1

5/16 OD x 1/32 WALL BRASS TUBING

CUT-OFF & FLATEN BOTH SIDES

5/8"

5/16"

2

ROUND

FLARE

1 1/2"

3

1/32" SAW SLOT

5/16"

4

CLOSE END WITH SPECIAL PLIERS

9-17-75

5

SCALE ½ DOUBLE SIZE

5 REQUIRED

	ISSUE 9-17-75	J.H.	TITLE: FISCHER WALL MOD. DENTAL X-RAY UNIT CABLE CONN PLUG - FLOATING SOCKET
	CHANGED		
	"		
	"		
	"		
	"		

H. G. FISCHER & CO. CHICAGO, ILL. | CAT. NO. | PART NO. 12434

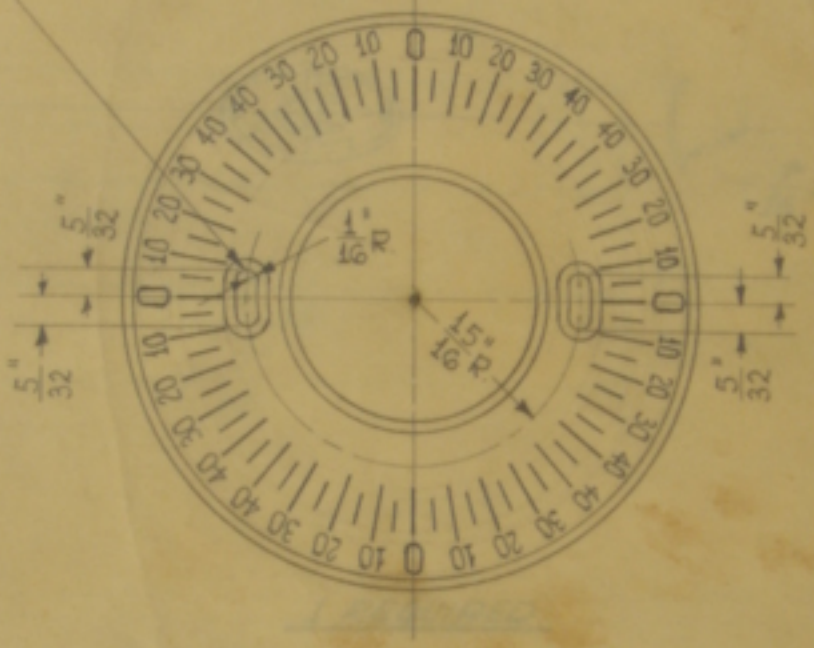


OBSOLETE

		ISSUE	
		CHANGED	
PE		"	
SH	CHROME	"	

TITLE: FISCHER MODEL GM MOBILE
ANGLE REGULATOR PLATE

PUNCH 2 SLOTS WITH
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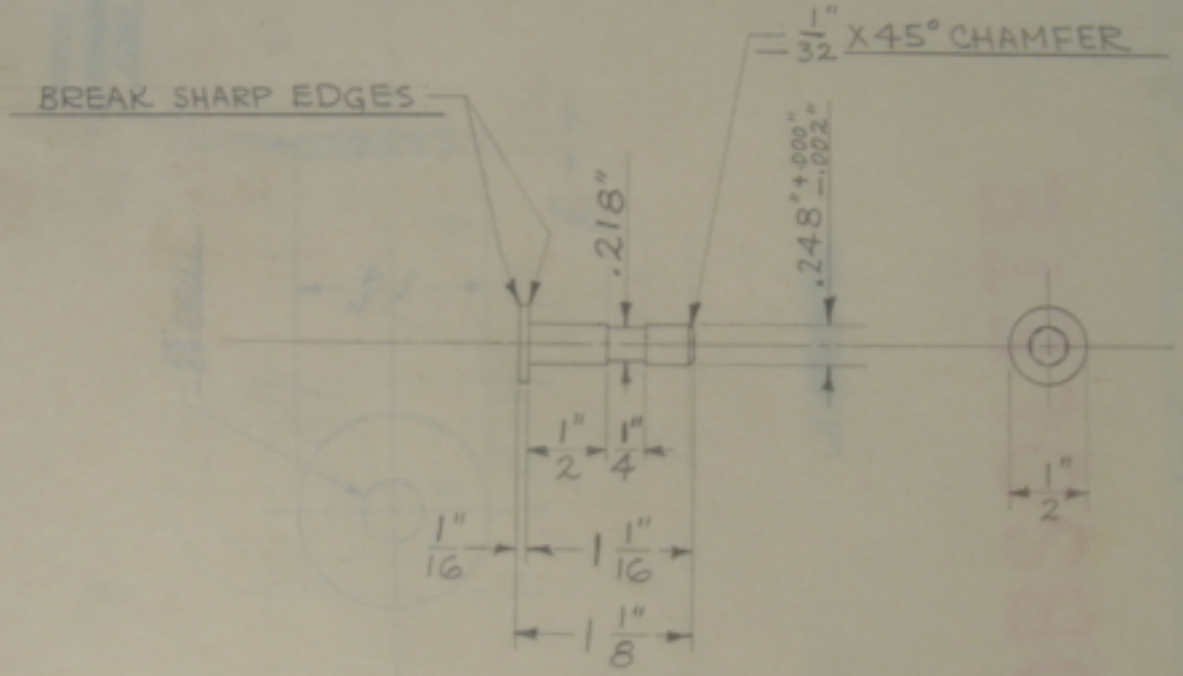
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OCTOBER, 1924

See Pages
8 and 9

for further announcement
of the

Annual Fall Physiotherapeutic Convention

at

Chicago

Program for Our

Monthly Physiotherapeutic Meeting

Monday, November 10th, 1924

L. C. SAMMONS, M. D., Shelbyville, Ind.
"Physiotherapy in General Practice" . . . . . 10:00 to 11:00 A. M.

WM. E. HOWELL, M. D., Chicago, Ill.
"Ease and Effectiveness of Electro-Coagulation Operations" . . . . . 11:00 to 12:00 Noon

D. W. KOBAK, M. D., Chicago, Ill.
"Diathermy and Sinusoidal as Complimentary Technic" . . . . . 1:30 to 2:30 P. M.

ABRAHAM R. HOLLENDER, M. D., Chicago, Ill.
"The Influence of Medical Diathermy on Tinnitus Aurium" . . . . . 2:30 to 3:15 P. M.

MAURICE H. COTTLE, M. D., Chicago, Ill.
"The Scope of Indirect Diathermy in Certain Eye Conditions" . . . . . 3:15 to 4:00 P. M.

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BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

We have ample space for all of you. Remember the date and come to our Lecture and Demonstrating Rooms at

2335 WABANSIA AVENUE
CHICAGO

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DECEMBER, 1924

Program for Our

Monthly Physiotherapeutic Meeting

Monday, December 8th, 1924

W. B. CHAPMAN, M. D., Carthage, Missouri.
"The Application of Physical Agents in the Treatment of Pulmonary Tuberculosis" - 10:00 to 11:00 A.M.

T. A. KREUSER, M. D., Chicago, Illinois.
"Galvanism" - - - - - - - - - 11:00 to 12:00 Noon

C. L. BARBER, M. D., Lansing, Michigan.
"Applied Medical Diathermy" - - - 1:30 to 2:30 P.M.

W. B. CHAPMAN, M. D., will speak informally on "Physiotherapy in General Practice" - 2:30 to 4:30 P.M.

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FEBRUARY, 1925

Program for Our

Monthly Physiotherapeutic Meeting

Monday, March 9th, 1925

EMILE DU VAL, M. D., Chicago, Illinois.
"Industrial Physiotherapy"
Illustrated with motion pictures - - 10:00 to 11:00 A. M.

GUSTAV KOLISCHER, M. D., Chicago, Illinois.
"Malignant Tumors and Electrocoagulation"
Illustrated with motion pictures - - 11:00 to 12:00 A. M.

L. K. EASTMAN, M. D., Chicago, Illinois.
"Physiotherapy in Fracture Work"
Illustrated with lantern slides - - 1:30 to 2:30 P. M.

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BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

One of the most interesting and instructive programs ever offered at our meetings has been arranged for this date.

Physicians and surgeons are cordially invited to attend throughout the session or during those periods covering subjects in which they are especially interested.

In addition to the lectures, each speaker will be glad to answer any questions in connection with your own physi-therapeutic problems.

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Program for Our

Monthly Physiotherapeutic Meeting

Monday, February 9th, 1925

GEORGE W. FUNCK, M. D., Chicago Illinois.
"The Treatment of Genito-urinary Diseases
With Diathermy" - - - - - - - - - - 10:00 to 11:00 A. M.

CARLTON L. ROWELL, M. D., Chicago, Illinois.
"Mixed Physiotherapy in the Treatment of
Gonorrhea and Its Complications" - - - - 11:00 to 12:00 M.

D. FRANK KNOTTS, M. D., Chicago, Illinois.
"The Complications of Gonorrhea" - - - - 2:00 to 3:00 P. M.

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BY ELEVATED — Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont, or

BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

These three physicians have had a great deal of experience in this particular work, and will be very glad to go into exhaustive detail in outlining the whys and wherefores of not only the disease but the treatments indicated.

Physicians who are interested in physiotherapy as applied to Genito-urinary disorders are urged to come, and to bring their most difficult questions with them! We will endeavor to work out the answers in full.

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APRIL, 1925

Program for Our

Monthly Physiotherapeutic Meeting

Monday, May 11th, 1925

A. L. YOCOM, JR., M. D., Charlton, Ia.
"Surgical Diathermy in the Treatment of Malignancies." A comprehensive discussion of various types of malignancies, together with practical demonstrations of the details of technic - - - - - - - - - - 10:30 to 12:30 M.

A. R. HOLLENDER, M. D., Chicago, Illinois
"Influence of Unusually Large Doses of Ultraviolet Radiations on the Nasal Membrane." - - - - - - - - - - - - - 1:30 to 2:30 P. M.

MAURICE H. COTTLE, M. D., Chicago, Illinois
"Difficult Hearing; A Report of Some Recent Studies in Its Treatment." - - - - - 2:30 to 3:30 P. M.

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BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

Physicians and surgeons are cordially invited to attend throughout the session or during those periods covering subjects in which they are especially interested.

In addition to the lectures, each speaker will be glad to answer any questions in connection with your own physiotherapeutic problems.

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Program for Our

Monthly Physiotherapeutic Meeting

Monday, April 13th, 1925

S. J. McNEILL, M. D., Chicago, Illinois
"The Treatment of Simple Goitre with a Combination of High Frequency and Resublimated Iodine" - - - - - - - - - - 10:00 to 11:00 A. M.

WM. E. HOWELL, M. D., Chicago, Illinois
"Principles and Application of Electrocoagulation" - - - - - - - - - - - - 11:00 to 12:00 A. M.

HARRY M. THOMETZ, M. D., Chicago, Illinois
"Tonsils"—Clinic - - - - - - - - - - - - 2 to 3:30 P. M.

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BY ELEVATED — Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont, or

BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

Dr. Thometz will perform the actual tonsil operations—removal by Surgical Diathermy—on several patients who have been secured for this clinic.

Physicians and surgeons are cordially invited to attend throughout the session or during those periods covering subjects in which they are especially interested.

In addition to the lectures, each speaker will be glad to answer any questions in connection with your own physiotherapeutic problems.

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JULY, 1925

Program for Our

Monthly Physiotherapeutic Meeting

Monday, August 10th, 1925

CHAS. E. STEWART, M. D., Battle Creek, Mich.
"Physiotherapy in a Sanitarium" ..... 10:00 to 11:00 A. M.

BASIL M. TAYLOR, M. D., Portland, Ind.
"Common Sense in Diathermy" ..... 11:00 to 12:00 A. M.

C. W. WESTERMAN, M. D., St. Louis, Mo.
"The Use of Light Therapy by the General Practitioner" ..... 1:30 to 2:30 P. M.

CHAS. E. STEWART, M. D., Battle Creek, Mich.
"Physiotherapy in Nervous Disorders" ..... 2:30 to 3:30 P. M.

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BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

Experience at the Battle Creek Sanitarium, of which he is Associate Medical Director, gives Dr. Stewart a wonderful background for his discussion of the subjects he has chosen. Dr. Taylor's talk on Common Sense in Diathermy will be illustrated by a number of cases recently treated by him with very satisfactory results. In his talk on The Use of Light Therapy by the General Practitioner, Dr. Westerman brings to bear his practical experience, which physicians will find most instructive and valuable.

Ample lecture-hall facilities have been provided, and physicians and surgeons are assured of proper facilities for getting the most out of this splendid program. There is, of course, no fee—just come to the main office and accommodations will be provided for you.

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Program for Our

Monthly Physiotherapeutic Meeting

Monday, June 8th, 1925

R. F. ELMER, M. D., Chicago, Illinois
"Tonsils"—Clinic - - - - - - - - - - - 10:00 to 11:00 A. M.

W. B. CHAPMAN, M. D., Carthage, Missouri
"Diathermy in Gynecology" - - - - - - - 11:00 to 12:00 A. M.

W. B. CHAPMAN, M. D., Carthage, Missouri
"Electro-surgical Removal of Neoplasms" - - 1:30 to 3:30 P. M.

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BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

Dr. Elmer has already performed over 400 tonsillectomies by the electro-coagulation process, and will demonstrate his actual technic on patients who have been secured for the occasion.

Dr. Chapman has been doing a great deal of G. U. work with both medical and surgical diathermy, and has a number of original and very interesting slides to introduce along with his two appearances on this program. This feature should prove very interesting, and we are making ample preparations for an overflow crowd. A hall has been arranged for, which will insure a seat to every physician attending.

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SEPTEMBER, 1925

4th Annual Physiotherapeutic Convention

A wonderfully interesting program has been arranged for this big annual meeting—see pages 15, 16, 17 and 18 of this Magazine. The Convention will be held at

The Drake Hotel, Chicago

October 12 to 16, 1925

Physicians and surgeons who are interested in Physiotherapy are cordially invited to attend, without charge or obligation. The program, sponsored by the Fischer Company, will be wholly in charge of well-known physicians and surgeons. Reservations at the Drake or other hotels will be attended to on request by the

Educational Department

H. G. FISCHER & COMPANY, Inc.

Physiotherapy Headquarters

2335 Wabansia Avenue CHICAGO, ILL.

Program for Our

Monthly Physiotherapeutic Meeting

Monday, September 14, 1925

EMILE C. DUVAL, M. D., Chicago, Ill.
"Indications for Diathermy" ..... 10:00 to 11:00 A. M.

A. R. HOLLENDER, M. D., Chicago, Ill.
"Light Therapy in Otitis Media" ..... 11:00 to 12:00 A. M.

EMILE C. DUVAL, M. D., Chicago, Ill.
"A Scientific Basis for Diathermy Technic" ..... 1:30 to 2:30 P. M.

M. H. COTTLE, M. D., Chicago, Ill.
"Indications for Diathermy in Eye, Ear, Nose and Throat Diseases" ..... 2:30 to 3:30 P. M.

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Specializing in Industrial Physiotherapy, as he does, Dr. DuVal is in a position to speak with an authority based on a remarkably broad experience. Physicians and surgeons desiring information as to when and how to employ Diathermy will do well to attend his lectures. Drs. Hollender and Cottle likewise have specialized extensively in eye, ear, nose and throat work and their experience, over a period of years, with physiotherapy in such disorders, qualifies them to pass on to others much interesting and valuable data.

Ample lecture-hall facilities have been provided, and visiting physicians and surgeons are assured of proper facilities for getting the most out of this splendid program. There is, of course, no fee—just come to the main office and accommodations will be provided for you.

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NOVEMBER, 1925

Program for Our

Monthly Physiotherapeutic Meeting

Monday, December 14, 1925

A. L. YOCOM, JR., M. D., Charlton, Iowa.
"Electrocoagulation of Malignancies" - 11:00 to 12:00 A. M.

G. W. FUNCK, M. D., Chicago, Ill.
"The Treatment of Genitourinary Diseases with Diathermy" - - - - - - - - - - 1:30 to 2:30 P. M.

MR. E. W. ERIKSON, of Chicago, will discuss the practical application and usages of Quartz Ultra-Violet Light, 10:00 to 11:00 A. M. and 2:30 to 3:30 P. M.

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Dr. Yocom is well known to those who have been regular attendants at this series of clinics, as a well-informed and interesting talker on physiotherapeutic subjects, he speaks from experience, and his talk on malignancies will be well worth hearing. Dr. Funck, too, brings to this clinic a profound knowledge of his subject, and G. U. men are especially invited to hear him. In presenting the talk by Mr. Erikson, we are following the suggestions of many physicians who have asked for a discussion of Ultra-Violet by an expert who can explain the quartz lamp from the practical end.

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2335 Wabansia Avenue, Chicago

Last Call for the 4th Annual Physiotherapeutic Convention

At the Drake Hotel, Chicago, October 12th to 16th, 1925—the greatest gathering of its kind ever held! Lectures, Clinics, Discussions. Further details of the program given inside this magazine.

Conducted by Physicians, for Physicians. The program, sponsored by the Fischer Company, will be wholly in charge of well known physicians and surgeons. An A. M. A. card or its equivalent will ensure admission. No charges, no obligation. All physicians and surgeons interested in Physiotherapy are cordially invited.

Reduced railroad fares at the rate of one and one-half fares for the round trip have been granted. Apply for "certificates" when buying tickets to Chicago; secretary at the Convention will give further information.

Reservations at the Drake or other hotels will be attended to for visitors to the Convention, on request, by the

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Program for Our

Monthly Physiotherapeutic Meeting

Monday, February 8th, 1926

L. K. EASTMAN, M. D., Medical Director and Owner Keystone Hospital, Chicago, Illinois.
"Physiotherapy in the Treatment of Fractures"
- - - - - - - - - - - - - 10:00 to 11:00 A. M.

L. M. OTIS, M. D., Medical Superintendent, Otis Hospital, Celina, Ohio.
"Diathermy for the General Practitioner" - 11:00 to 12:00 A. M.

EMILE C. DUVAL, M. D., Chicago, Illinois.
"The Treatment of Osteomyelitis by Diathermy"
- - - - - - - - - - - - - 1:30 to 2:30 P. M.

L. M. OTIS, M. D., Celina, Ohio.
"The Economic Value of Physiotherapy" - 2:30 to 3:30 P. M.

These meetings are open to physicians and surgeons, without fee or obligation. Come any time during the day and stay as long as you like. These clinics are strictly informal, and are wholly under the supervision of the various physicians on the program.

For February, an unusually interesting program is offered, including talks and demonstrations by three physicians whose names are well known in physiotherapeutic circles.

The Fischer Plant is easily reached by elevated, surface lines or motor car.

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Physiotherapy Headquarters
2333-43 Wabansia Avenue, Chicago

Program for Our

Monthly Physiotherapeutic Meeting

Monday, January 11th, 1926

M. H. COTTLE, M. D., Chicago, Ill.
"Physiotherapy as Employed in Eye and Ear Work" - - - - - - - 10:00 to 11:00 A. M.

GUSTAV KOLISCHER, M. D., Chicago, Ill.
"Diathermy in Medical Kidney Diseases" - 11:00 to 12:00 A. M.

J. H. HAMMON, Vincennes, Ind.
"General Discussion of Physiotherapy" - 1:30 to 2:00 P. M.

EDWARD C. HELWIG, M. D., Vincennes, Ind.
"Tonsil Clinic" - - - - - - - - 2:00 to 3:30 P. M.

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BY SURFACE CAR—Western Avenue to Wabansia Avenue, and one block east to Claremont.

Here is a program of exceptional interest to the physician who employs the physiotherapeutic modalities. Dr. Cottle's intensive study of Eye and Ear work has given him a wealth of material for this talk. Dr. Kolischer, always a popular speaker at any clinic, here offers a new subject. Doctors Hammon and Helwig have a proved tonsil technic that has been successfully employed in hundreds of cases. Ample lecture hall and clinic facilities have been provided so that every visitor may be assured of a seat. There is no fee, of course; every M. D. interested in Physiotherapy is cordially invited.

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2333-43 Wabansia Avenue, Chicago

Program for Our

Monthly Physiotherapeutic Lecture Clinic

Monday, March 8th, 1926

HERMAN J. NEUBAUER, M. D., Hinckley, Illinois.
"Why the Country Doctor Should Use Diathermy"
10:00 to 11:00 A. M.

DRS. HELWIG AND HAMMON, Vincennes, Ind.
"Tonsil Clinic—A Further Demonstration of Technic"
11:00 to 12:00 A. M.

JAMES L. SMITH, M. D., Chicago, Illinois.
"Diathermy Research in Some of the Larger Medical Schools"
1:30 to 2:30 P. M.

HERMAN J. NEUBAUER, M. D., Hinckley, Illinois.
"Inter-relationship of Quartz Light and Diathermy"
2:30 to 3:30 P. M.

Physicians and surgeons are cordially invited to attend these lecture clinics, which are open to medical men without fee or obligation. The meetings are strictly informal, and are wholly under the supervision of the various physicians on each program. Following each lecture or clinic, opportunity is afforded for open discussion of any of the subjects covered.

Doctors Helwig and Hammon are returning for a second demonstration of their highly interesting and successful tonsil technic, in response to numerous requests. Herman J. Neubauer will speak out of the wealth of his experience in the field, and Dr. Smith will report on his recent investigation of conditions in medical schools.

The Fischer Plant is easily reached by elevated, surface lines or motor car.

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Physical Therapy Headquarters

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The Fischer Model "G-3"
Diathermy Cabinet

Catalog No. 2125

Explanation of Diagram on Opposite Page

No. 1—This terminal forms one outlet for all three diathermy circuits, and must always be used with one of the other three (low voltage, medium voltage, high voltage) diathermy outlets.

No. 2—Highest voltage diathermy terminal. To complete circuit to patient use outlets Nos. 1 and 2.

No. 3—Medium voltage terminal. To complete medium voltage circuit to patient use outlets Nos. 1 and 3.

No. 4—Lowest voltage terminal. To complete circuit to patient use outlets Nos. 1 and 4.

No. 5—Double scale milliampere meter: 0 to 1000 M. A. lower scale to be used for measuring small amounts of current, and the 0 to 4000 M. A. scale for the heavier discharges. (See paragraph on "Meter" for further information.)

No. 6—Control plate for meter No. 5. For reading of current discharge up to 1000 M. A. set indicator on 1000. Set indicator on 4000 for reading heavier currents. Be cautious when using lower scale, as should your cords or electrodes touch one another and create a short circuit, the meter is apt to burn out. The outfit may be operated without the meter by placing the indicator on "off" point.

No. 7—High tension high frequency Tesla pole for uni-polar discharge only. Not to be used in connection with any other outlet.

No. 8—Multiple Spark Gap. Tungsten points may be adjusted individually by means of small black knobs, or simultaneously with the large black master knob. One, two, three or four sets may be used, depending on the current output desired, although adjusting all points equal distances apart gives more uniform, satisfactory results.

No. 9—Pilot lamp. Indicates current on or off.

No. 10—Main controller. For weakest current discharge set indicator on point 1. Increase volume by turning indicator to right; point 9 being maximum.

No. 11—Line connection. Port of entry for 110 volt, 60 cycle alternating current, or as indicated on nameplate.

No. 12—Main switch. Button to right, and white dot showing, current ON. Button to left, current OFF.

No. 13—Terminal outlets for foot switch. When using foot switch leave main switch No. 12 in the OFF position.

No. 14—Protecting fuse for milliampere meter.

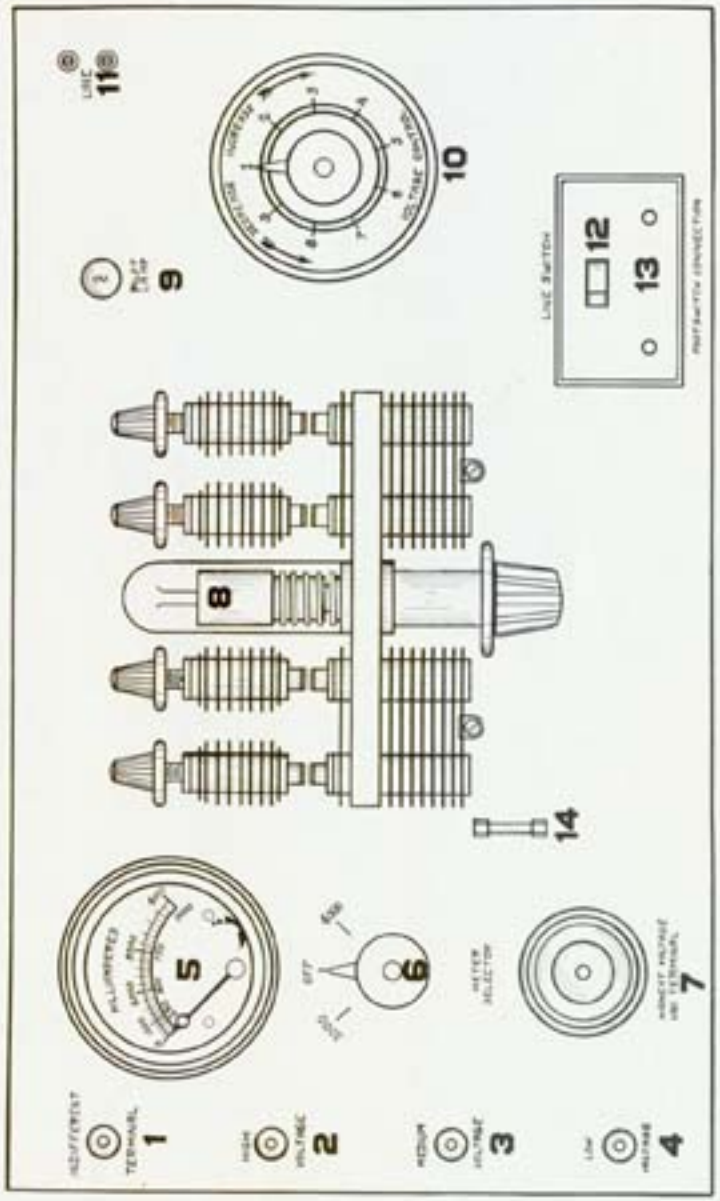


Diagram of Controls and Outlets on "G-3" Outfit

Detail Explanation of Panel Diagram

No. 1—This terminal, forming one outlet for all of the bi-polar diathermy circuits, must always be used with one of the other outlets, No. 2 for high voltage, No. 3 for medium voltage or No. 4 for low voltage, and if desired, with the highest voltage pole No. 7. No. 1 is not used in connection with No. 7 when the latter is to be used for monopolar discharge for high frequency glass vacuum and non-vacuum electrodes, monopolar desiccation, fulguration, etc.

No. 2—Terminals Nos. 2, 3, 4 and 7 are merely different taps taken from the high voltage generating source in the cabinet, and before applying diathermy current the operator should estimate the type of current desired as compared to the resistance of the part to be treated, and use either of the four outlets in connection with No. 1 as desired. No. 2 when used in connection with No. 1 completes the highest voltage diathermy current available from the Type "G-2" Cabinet. This current is mainly used for medical diathermy treatments where the resistance of the part is rather high, or for autocondensation purposes. The voltage across terminals Nos. 1 and 2 in combination is about 50% higher than across terminals Nos. 1 and 3.

It will be found on test that while more current may be obtained under certain conditions when using terminals Nos. 1 and 2, that were these conditions changed other combinations will be found superior.

No. 3—Outlets Nos. 1 and 3 provide a medium voltage diathermy current. This current will be found suitable for certain electrocoagulation purposes, that is, where the voltage across terminals Nos. 1 and 4 is not sufficient to overcome the resistance at the point of operation, and for the majority of the medical diathermy applications. The voltage across terminals Nos. 1 and 3 is approximately 50% greater than across terminals Nos. 1 and 4.

No. 4—Outlets Nos. 1 and 4 provide the lowest voltage diathermy current available. This current is mainly used for electrocoagulation (surgical diathermy) purposes, and for medical diathermy applications where the resistance of the part being treated is low.

No. 5—The milliampere meter is provided with two distinct windings, with an indicating scale for each, that the smaller current discharges may be read with just as much accuracy as the heavier loads. Always make sure that the meter selector control No. 7 is on the 1,000 mark for reading currents under 900 M. A. and then read the lower scale on the meter to correspond. Set indicator on the 4,000 mark when reading heavier currents, and read the upper scale to correspond. Were this meter provided only with a 4,000 M. A. scale, you would find it next to impossible to get accurate readings under 1,000 M. A., hence the double scale.



Showing Type "G-3" Diathermy Cabinet Closed

Catalog No. 2125

No. 6—The selector switch is used in connection with the double-scale on meter No. 5. For the reading of heavy currents (anything over 900 milliamperes), set the indicator to the 4,000 mark and read the upper meter scale. For accurate readings of currents under 900 milliamperes, set the indicator to the 1,000 mark and read the lower scale on the meter. Were a one-scale meter provided, the operator would experience considerable difficulty in making accurate readings of any and all currents used, whereas with the double scale accurate readings are possible during all treatments.

No. 7—This terminal may be used either for unipolar, very high voltage low milliamperage applications (monopolar desiccation, for exciting glass vacuum and non-vacuum electrodes and fulguration), or may be used in conjunction with the terminal No. 1 for the bipolar discharge. The voltage here is exceedingly high, but the milliamperage available is correspondingly low. There are many well known operators who prefer exceedingly high voltage for certain applications for both unipolar and bipolar use.

No. 8—The multiple spark gap is provided with 8 electrically welded tungsten tips, and is constructed with extremely heavy radiating facilities, thus insuring two things; a constancy of current output at any voltage or milliamperage, and the elimination of over-heating.

The spark points may be adjusted individually by means of the small control knobs toward the back, or collectively by using the large master control knob to the front. Careful adjustment of this gap, and due consideration given to the auto control selector No. 10 will insure an even, resonant discharge of diathermy or high frequency current for any purpose. The operator may either adjust both controls Nos. 8 and 10, each in conformity with the other, to obtain true resonance of output, or, after you have mastered the machine you may set No. 10 to the point where you know the current desired can be obtained for the treatment at hand, and make your minimum to maximum adjustment with No. 8, entirely.

The spark interrupter gap is the most important regulating feature on any high frequency generator. Its function is to regulate the discharge of the high tension current in connection with control No. 10, and may be adjusted either with the current on or off. When the tungsten spark interrupter tips are closed, there is a direct short circuit on the transformer, and no discharge from any of the high tension outlets.

As these spark interrupter points are gradually separated, the high tension current passing across the gap produces an oscillating or vibratory effect (evidenced by sparking) which is increased up to that point where the voltage is insufficient and the sparking ceases. The highest rate of oscillations—that is, the highest frequency of discharge—is obtained with the spark interrupter points nearly closed. At this point, also, is obtained the very smoothest flow of current.

More milliamperage is obtained by separating the spark interrupter points. Should you separate these points so far that the sparking ceases, simply bring the points closer together and the sparking will be resumed.

The current discharge across the spark interrupter points ceases when the voltage is insufficient to carry across. Voltage is increased with control No. 10.

An individual pair of points, only, may be employed for the very lightest currents, or two pairs, or any number, if properly adjusted. It is inadvisable to have one pair of points widely separated, while the others are adjusted close together. For the best, most uniform discharge, we recommend using all points uniformly adjusted, wherever possible.

The sparking points are made of pure electrically welded tungsten—the hardest and most durable material available for this purpose. They need no attention whatever. They will not pit, become corroded, or with just ordinary care need any adjusting. The proper setting of the movable spark points is such that the tip extending from the bearing is practically the same length as the stationary tip on the opposite side.

Wipe gap occasionally with a dry cloth. Dust forms a conductor, and must be removed.

No. 9—The pilot lamp is used to indicate the fact that current is passing through the transformer. When the current is cut off, the light goes out, and with the current on, the lamp will illuminate with a red glow. This is merely an additional safety measure, as a glance at the cabinet will indicate whether the current is on, regardless of the position of the buttons on the line switch No. 12.

No. 10—This is the main controller for the 9-step auto transformer. Point No. 1 is the setting for the weakest output, and turning the pointer to the right increases the discharge up to maximum at point 9. You will find that the adjustment is very positive, that is, there is a very decided click as contact is made on any one of the points, and that while you can pass from maximum to minimum (from point 9 to point 1), it is impossible to turn backward from 1 to 9. This is done because a big drop in current from maximum to minimum will do no appreciable damage, whereas a sudden increase (a turn backward from 1 to 9) might be a dangerous procedure. This forms the main control for the primary current entering the transformer, whereas the spark gap No. 8 controls the volume of the secondary current after it leaves the transformer. For best results, therefore, it is quite advisable

to adjust one somewhat proportionately with the other, to insure a resonant discharge.

No. 11—Line connection. Always be very sure that the line connecting cord is placed into a lamp socket on an alternating current line of the proper voltage and cycle as indicated on the nameplate, or if direct current only is available, be sure that the output of your rotary converter is exactly the same as indicated on this nameplate.

No. 12—The main line switch controls the alternating current entering the cabinet. When the white button is down, the current is on, that is, the switch is closed. When the black button is down, the current is cut off. This switch is made with the contact bars fully twice the required size for an apparatus of this nature, and this extra material is merely furnished to insure long life.

No. 13—A foot switch is an absolute necessity when performing electrocoagulation operations, and for certain other diathermy and high frequency work. The foot switch terminals are placed in the outlets No. 13, and the circuit is closed by pressing on the foot plate instead of closing switch No. 12. Switch No. 12 is left in the "off" position when the foot switch is employed.

No. 14—This fuse offers protection to the milliampere meter should you accidentally, or otherwise, pass too heavy a current through with the wrong setting of selector No. 6, or by possibly touching your electrodes or cord tips together. This fuse will blow out when approximately 1,500 milliamperes are reached with the lower scale (1,000 M. A.) adjustment. Inside the cabinet a coil is connected across this fuse circuit which carries the current after the fuse is blown, preventing the peak voltage from rising to a dangerous point and giving the patient a momentary shock, and keeps the current output within safe limits through the meter. While the fuse will glow to a dull red heat when the 1,000 milliampere point is reached on the lower scale, and 4,000 M. A. on the upper scale, it will not blow out under a 50% overload.

Medical Diathermy is obtained as follows: Set the indicator on the auto transformer control No. 10 on one of the lower settings (2, 3 or 4). Close the spark interrupter points No. 8 (these points should come together evenly). The rubber-covered connecting cords are used to make connections from the diathermy electrodes, which electrodes are selected to suit the individual case, to either outlets 1 and 2, 1 and 3 or 1 and 4, depending on the current output desired.



No. 1334 Cords

All tissue offers some resistance to the discharge of the diathermy current, and the greater the resistance the greater the voltage that must be employed to overcome it. Hence, outlets 1 and 4 will be suitable for very light work, 1 and 3 when the part to be treated is not very heavy, or the electrodes placed not too far apart, and 1 and 2 outlets for the heavier parts of the body.

For the initial test, we suggest placing one cord tip into outlet 1, and the other into outlet 3. The other ends of the cords are slipped in the electrode clips, which in turn are fastened to the selected electrodes; we will substitute a bowl of salt water for the patient. Cut off two small pieces of sheet block tin electrode material, and attach them to the cords with the clips (catalog No. 868). Place these two pieces of metal into a bowl of brine, and see that they do not come closer than one inch one to the other. Close the line switch No. 12 and gradually open the spark interrupter points No. 8 until the meter needle shows movement. As the spark points are separated, the milliampere reading will increase. Advance controller No. 10 another point, and further separate the spark points. Decrease and increase the volume of current generated by altering both of these controllers Nos. 8 and 10, until you become thoroughly familiar with the controlling procedure. It would be well to try this a number of times with different sizes of electrodes, by using stronger and weaker brine solutions, that is, with lesser and greater resistances, until you become thoroughly familiar as to how much each individual maneuver affects the current output.



No. 840 Block Tin



No. 868
Mesh Electrode Clamp

Now try outlets 1 and 2 in combination, and you will find that as you decrease and increase the resistances of the water medium and try various settings of the auto control No. 10, and bring together and separate the points on the spark gap, the readings will be quite different as compared to the amount of current generated when employing outlets 1 and 3.

Then try outlets Nos. 1 and 4 in combination, and you will find the results again quite different as compared to 1 and 3 and 1 and 2. It is inadvisable to apply the electrodes to the patient until you have become thoroughly familiar with the apparatus, have studied the instruction book, "Diathermy Therapy," or have had suitable instructions from one who knows the apparatus.

When making the above tests, be sure that your meter selector switch No. 6 is set to the 4,000 point. Then, after you have made a few tests and wish to try out lower milliamperage readings, you may set the indicator to point 1,000.

To Obtain Electro-Coagulation (Surgical Diathermy) Current Set the indicator on the auto transformer control No. 10 on one of the lower settings (2, 3 or 4). Close the spark interrupter points No. 8 (these points should come together evenly). The rubber-covered connecting cords are used to make connections from the diathermy electrodes which electrodes are selected to suit the individual case, to outlets 1 and 4.

Here, again, the item of tissue resistance must be taken into consideration, and the voltage outlets selected to suit the individual operator. Ordinarily terminals 1 and 4 supply the proper voltage, although 1 and 3 at a slightly higher potential, may be required for some work. The voltage as supplied from outlets 1 and 2 is rarely necessary for surgical procedure.

It is customary when speaking of electrocoagulation technic to refer to the *active* and *indifferent* electrodes; the active electrode being the small point or disc which is placed in direct contact with the diseased tissue, and the latter (the indifferent electrode), the larger metallic plate to cover a great deal of skin surface to prevent heating sufficient to destroy healthy tissue, is placed preferably on the opposite side of the body or at least adjacent to the point of operation.

A piece of raw beef on a flat plate of block tin will best serve as the patient for the preliminary test. Grasp the insulated handle of the active coagulation electrode No. 862 at least 2 inches away from the metal end and preferably with the flexible connecting cord passing over the back of the hand. A foot switch should be employed for this work. Stepping on the foot switch closes the circuit; or if the foot switch is not employed, close line switch No. 12. Open the spark interrupter points slightly, bring the point of the active electrode down to the meat, and you will observe sparks from the point of contact and some small reading on the milliampere meter. Never fail to have meter selector indicator No. 6 either on "off" or 4,000 positions; never on the 1,000 point, as surgical work calls for very heavy current discharges, and if you leave this selector connected to the wrong scale, you are liable to burn out the meter.



No. 862
Electrocoagulation Electrode

Press the needle-point electrode into the meat to different depths; increase and decrease the current by adjusting the spark interrupter points, and vary the voltage with the controller No. 10. Observe how the milliamperage will vary with these different settings. Now hold the electrode away from the meat a short distance, to cause sparking. You will find after making a series of these tests that you can produce varied depths of desiccation, coagulation and blanching at will. It is absolutely necessary that a series

of experiments along this line be made, that you may thoroughly familiarize yourself with the current action before trying applications on living tissue. When once fully conversant with the apparatus, the required currents for various degrees of coagulation, etc., we suggest that meter selector switch indicator remain at the "off" point; that is, the meter cut out of the circuit entirely, as then should you accidentally touch your electrodes one to the other, your meter would not be damaged.

To Obtain D'Arsonval Autocondensation Current Have the current control indicator No. 10 set on point 5. Place selector No. 6 on the 1,000 mark, as autocondensation treatment readings rarely exceed 800 milliamperes. Close the spark interrupter points No. 8. The autocondensation pad is connected by means of one of the rubber-covered cables to outlet No. 2. The patient should recline comfortably on this pad, and either no pillow employed or one that is quite thin, the object being to keep the patient's entire body, even the head, as close to the pad as possible. Connect other rubber-covered cable from outlet No. 1 to the long nickel-plated handle, which handle should be held firmly in the patient's two hands. Always place a heavy folded towel or other similar insulating medium between the body and the hands, to prevent any possible leakage from the handle to the body. Some operators prefer employing an electrode of block tin placed either on the abdomen or chest instead of this No. 81 handle, and the technic is a matter of choice. Close switch No. 12 and gradually open the spark interrupter points No. 8 until a smooth flow of current is obtained, but never so far that the discharge becomes noisy or uneven in character.



No. 418 Autocondensation Pad



No. 81
Autocondensation Handle

The current volume is increased and decreased by means of the auto transformer control No. 10, as well as the spark interrupter points. The distance between these points should be adjusted equally. Now have the patient rise up slightly with the current on, and observe how the reading on the milliampere meter varies as the body moves away from the pad, that is, away from the charged field. This is simply to prove to you that for maximum current effect the patient must remain close to the pad.

Indirect Diathermy This is the title given by certain operators to a slight modification of the autocondensation treatment, that is, where the indifferent electrode is the autocondensation pad and the active electrode a plate of block tin.

Unipolar High Frequency Application Set the indicator No. 10 on any one of the lower settings (2, 3, or 4), and close the spark interrupter gap No. 8. Connect the heavy insulated cable No. 83 to terminal No. 7, and to the high frequency handle. A glass electrode, either vacuum or non-vacuum type, should be held firmly in the handle clamp. As the milliampere meter No. 5 is not used in connection with this unipolar discharge, the setting of meter selector No. 6 is immaterial. Close switch No. 12 and gradually open the spark interrupter points, and increase the voltage by means of controller No. 10 until the desired amount of current is obtained through the bulb.



No. 2009 High Frequency Electrode

Indirect High Frequency Applications are obtained from the same current as used for exciting the glass electrodes, directly from uniterminal No. 7, but the application is reversed. Instead of connecting the heavy cord No. 83 from uniterminal No. 7 to the high frequency handle or to the electrode direct, the current is sent through the patient by means of the metal handle No. 81. The patient grasps the No. 81 handle firmly (which is directly connected with the heavy cord to terminal No. 7), the current is turned on and regulated as for high frequency, and the discharge is withdrawn from the body with the operator's fingers at the point desired.



No. 83 H. F. Cord

Desiccation has been referred to in the past as "fulguration," and refers to a dehydrating process similar to a minor application of electrocoagulation current. The discharge is monopolar (the bipolar technic is referred to as electrocoagulation). The current is taken from the uniterminal No. 7 and is regulated by means of controller No. 10 and spark gap No. 8. This current is not measured by the milliampere meter; hence the setting of indicator No. 6 is immaterial.

Indirect Desiccation or as it has formerly been referred to "indirect fulguration," is obtained in exactly the same manner as the indirect high frequency discharge, only instead of the fingers withdrawing the current in a mild manner at the spot desired, a pointed electrode of metal is employed. This electrode must not be insulated, but the bare metal is held in the operator's fingers. The current may be extracted from the patient from a very limited area, and the effect may be one of extreme heat or merely sparking, at the will of the operator. Sufficient current to desiccate or to dehydrate only, is employed. The setting of the

spark gap No. 8 is very important in this treatment, to avoid passing too much current.

Foot Switch For all electrocoagulation work, and in many instances for medical diathermy applications, a foot switch is quite necessary. The metal ends on the foot switch connecting cable are plugged into the two openings protected with rubber bushings on the left side of the cabinet. When the foot switch is pressed, it closes the circuit in place of line switch No. 12. You may leave the foot switch connected to the cabinet at all times and simply use the line switch as desired, pulling out the foot switch from under the cabinet when you wish to use it.



No. 1498 Foot Switch

CAUTIONS

Always be sure that line switch No. 12 is open, and that pilot light No. 9 is out before leaving the cabinet.

Always observe the setting of voltage control No. 10 before turning current through patient. Treatments should start with a minimum discharge and be increased gradually to maximum.

Always observe the position of the spark interrupter points on gap No. 8 before closing the circuit to the patient. These points should be closed, or nearly closed, before the current is turned on, and opened gradually to the desired milliamperage.

Do not permit electrodes or cord tips to touch one another with the current on. This creates a dead short circuit, and will undoubtedly burn out your milliampere meter.

Glass electrodes often crack after a treatment when laid against a cold surface. Bursting is caused from sudden shrinking at the point of contact.

Dust your spark gap frequently. Dust forms a partial conductor and must be removed. Clean metal surfaces on all parts of the gap radiate heat much more readily than dirty ones. Keep the gap clean.

Never leave your machine for a long period with the current on. If the outfit is not to be used for some hours, as for instance over night, the safest procedure is to cut off the current where your connecting cable is attached to the line wiring.

Never connect this apparatus to any other line current than that plainly indicated on the nameplate.

Now, last but by no means least, read the book on operating technic, or as we term it, "Diathermy Therapy" form No. 535, from cover to cover. It was written for you, Doctor, and the contents were carefully checked over. It should prove of valuable assistance to you.

INSTALLING AND OPERATING

INSTRUCTIONS

for the

Fischer Portable Diathermy Apparatus

TYPES "G2" and "GP2"

H. G. FISCHER & CO., Inc.

Physiotherapy Headquarters

2323-37 Wabansia Avenue CHICAGO, ILLINOIS

Form No. 946



THE FISCHER "G2" HOSPITAL PORTABLE DIATHERMY UNIT

Catalog No. 1390

Mounted on Walnut Cart No. 1255

Explanation of Diagram on Opposite Page

No. 1—This terminal forms one outlet for all three diathermy circuits, and must always be used with one of the other three (low voltage, medium voltage, high voltage) diathermy outlets.

No. 2—Highest voltage diathermy terminal. To complete circuit to patient use outlets Nos. 1 and 2.

No. 3—Medium voltage terminal. To complete medium voltage circuit to patient use outlets Nos. 1 and 3.

No. 4—Lowest voltage terminal. To complete circuit to patient use outlets Nos. 1 and 4.

No. 5—Double scale milliampere meter: 0 to 1000 M. A. lower scale to be used for measuring small amounts of current, and the 0 to 4000 M. A. scale for the heavier discharges. (See paragraph on "Meter" for further information.)

No. 6—Control plate for meter No. 5. For reading of current discharge up to 1000 M. A. set indicator on 1000. Set indicator on 4000 for reading heavier currents. Be cautious when using lower scale, as should your cords or electrodes touch one another and create a short circuit, the meter is apt to burn out. The outfit may be operated without the meter by placing the indicator on "off" point.

No. 7—High tension high frequency Tesla pole for uni-polar discharge only. Not to be used in connection with any other outlet.

No. 8—Multiple Spark Gap. Tungsten points may be adjusted individually by means of small black knobs, or simultaneously with the large black master knob. One, two, three or four sets may be used, depending on the current output desired, although adjusting all points equal distances apart gives more uniform, satisfactory results.

No. 9—Pilot lamp. Indicates current on or off.

No. 10—Main controller. For weakest current discharge set indicator on point 1. Increase volume by turning indicator to right; point 9 being maximum.

No. 11—Line connection. Port of entry for 110 volt, 60 cycle alternating current, or as indicated on nameplate.

No. 12—Main switch. Button to right, and white dot showing, current ON. Button to left, current OFF.

No. 13—Terminal outlets for foot switch. When using foot switch leave main switch No. 12 in the OFF position.

No. 14—Protecting fuse for milliampere meter.

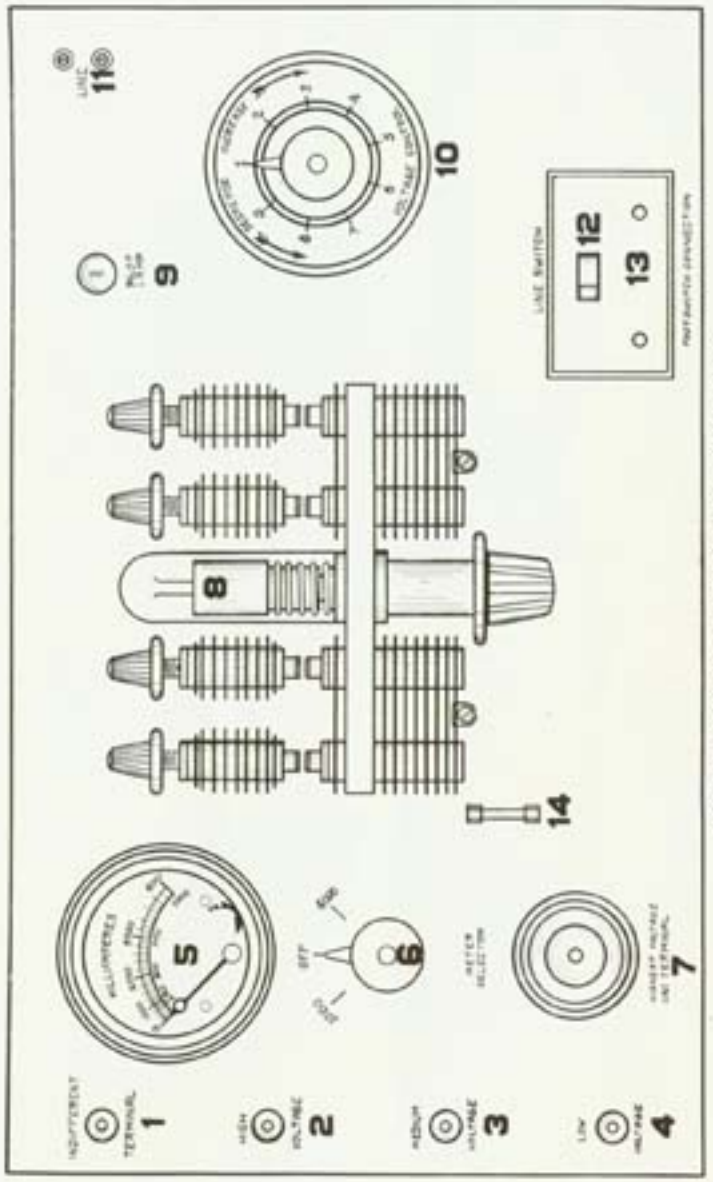


Diagram of Controls and Outlets on "G2" Outfit

Detail Explanation of Panel Diagram

No. 1—This terminal, forming one outlet for all of the bi-polar diathermy circuits, must always be used with one of the other outlets, No. 2 for high voltage, No. 3 for medium voltage or No. 4 for low voltage, and if desired, with the highest voltage pole No. 7. No. 1 is not used in connection with No. 7 when the latter is to be used for monopolar discharge for high frequency glass vacuum and non-vacuum electrodes, monopolar dessication, fulguration, etc.

No. 2—Terminals Nos. 2, 3, 4 and 7 are merely different taps taken from the high voltage generating source in the cabinet, and before applying diathermy current the operator should estimate the type of current desired as compared to the resistance of the part to be treated, and use either of the four outlets in connection with No. 1 as desired. No. 2 when used in connection with No. 1 completes the highest voltage diathermy current available from the Type "G2" Cabinet. This current is mainly used for medical diathermy treatments where the resistance of the part is rather high, or for autocondensation purposes. The voltage across terminals Nos. 1 and 2 in combination is about 50% higher than across terminals Nos. 1 and 3.

It will be found on test that while more current may be obtained under certain conditions when using terminals Nos. 1 and 2, that were these conditions changed other combinations will be found superior.

No. 3—Outlets Nos. 1 and 3 provide a medium voltage diathermy current. This current will be found suitable for certain electrocoagulation purposes, that is, where the voltage across terminals Nos. 1 and 4 is not sufficient to overcome the resistance at the point of operation, and for the majority of the medical diathermy applications. The voltage across terminals Nos. 1 and 3 is approximately 50% greater than across terminals Nos. 1 and 4.

No. 4—Outlets Nos. 1 and 4 provide the lowest voltage diathermy current available. This current is mainly used for electrocoagulation (surgical diathermy) purposes, and for medical diathermy applications where the resistance of the part being treated is low.

No. 5—The milliampere meter is provided with two distinct windings, with an indicating scale for each, that the smaller current discharges may be read with just as much accuracy as the heavier loads. Always make sure that the meter selector control No. 7 is on the 1,000 mark for reading currents under 900 M. A. and then read the lower scale on the meter to correspond. Set indicator on the 4,000 mark when reading heavier currents, and read the upper scale to correspond. Were this meter provided only with a 4,000 M. A. scale, you would find it next to impossible to get accurate readings under 1,000 M. A., hence the double-scale.

THE FISCHER PHYSICIAN'S PORTABLE DIATHERMY UNIT



Showing Type "GP2" Open



Showing Type "GP2" Closed

Catalog No. 1393

No. 6—The selector switch is used in connection with the double-scale on meter No. 5. For the reading of heavy currents (anything over 900 milliamperes), set the indicator to the 4,000 mark and read the upper meter scale. For accurate readings of currents under 900 milliamperes, set the indicator to the 1,000 mark and read the lower scale on the meter. Were a one-scale meter provided, the operator would experience considerable difficulty in making accurate readings of any and all currents used, whereas with the double scale accurate readings are possible during all treatments.

No. 7—This terminal may be used either for unipolar, very high voltage low milliamperage applications (monopolar desiccation, for exciting glass vacuum and non-vacuum electrodes and fulguration), or may be used in conjunction with the terminal No. 1 for the bipolar discharge. The voltage here is exceedingly high, but the milliamperage available is correspondingly low. There are many well known operators who prefer exceedingly high voltage for certain applications for both unipolar and bipolar use.

No. 8—The multiple spark gap is provided with 8 electrically welded tungsten tips, and is constructed with extremely heavy radiating facilities, thus insuring two things: a constancy of current output at any voltage or milliamperage, and the elimination of over-heating.

The spark points may be adjusted individually by means of the small control knobs toward the back, or collectively by using the large master control knob to the front. Careful adjustment of this gap, and due consideration given to the auto control selector No. 10 will insure an even, resonant discharge of diathermy or high frequency current for any purpose. The operator may either adjust both controls Nos. 8 and 10, each in conformity with the other, to obtain true resonance of output, or, after you have mastered the machine you may set No. 10 to the point where you know the current desired can be obtained for the treatment at hand, and make your minimum to maximum adjustment with No. 8, entirely.

The spark interrupter gap is the most important regulating feature on any high frequency generator. Its function is to regulate the discharge of the high tension current in connection with control No. 10, and may be adjusted either with the current on or off. When the tungsten spark interrupter tips are closed, there is a direct short circuit on the transformer, and no discharge from any of the high tension outlets.

As these spark interrupter points are gradually separated, the high tension current passing across the gap produces an oscillating or vibratory effect (evidenced by sparking) which is increased up to that point where the voltage is insufficient and the sparking ceases. The highest rate of oscillations—that is, the highest frequency of discharge—is obtained with the spark interrupter points nearly closed. At this point, also, is obtained the very smoothest flow of current.

More milliamperage is obtained by separating the spark interrupter points. Should you separate these points so far that the sparking ceases, simply bring the points closer together and the sparking will be resumed.

The current discharge across the spark interrupter points ceases when the voltage is insufficient to carry across. Voltage is increased with control No. 10.

An individual pair of points, only, may be employed for the very lightest currents, or two pairs, or any number, if properly adjusted. It is inadvisable to have one pair of points widely separated, while the others are adjusted close together. For the best, most uniform discharge, we recommend using all points uniformly adjusted, wherever possible.

The sparking points are made of pure electrically welded tungsten—the hardest and most durable material available for this purpose. They need no attention whatever. They will not pit, become corroded, or with just ordinary care need any adjusting. The proper setting of the movable spark points is such that the tip extending from the bearing is practically the same length as the stationary tip on the opposite side.

Wipe gap occasionally with a dry cloth. Dust forms a conductor, and must be removed.

No. 9—The pilot lamp is used to indicate the fact that current is passing through the transformer. When the current is cut off, the light goes out, and with the current on, the lamp will illuminate with a red glow. This is merely an additional safety measure, as a glance at the cabinet will indicate whether the current is on, regardless of the position of the buttons on the line switch No. 12.

No. 10—This is the main controller for the 9-step auto transformer. Point No. 1 is the setting for the weakest output, and turning the pointer to the right increases the discharge up to maximum at point 9. You will find that the adjustment is very positive, that is, there is a very decided click as contact is made on any one of the points, and that while you can pass from maximum to minimum (from point 9 to point 1), it is impossible to turn backward from 1 to 9. This is done because a big drop in current from maximum to minimum will do no appreciable damage, whereas a sudden increase (a turn backward from 1 to 9) might be a dangerous procedure. This forms the main control for the primary current entering the transformer, whereas the spark gap No. 8 controls the volume of the secondary current after it leaves the transformer. For best results, therefore, it is quite advisable

to adjust one somewhat proportionately with the other, to insure a resonant discharge.

No. 11—Line connection. Always be very sure that the line connecting cord is placed into a lamp socket on an alternating current line of the proper voltage and cycle as indicated on the nameplate, or if direct current only is available, be sure that the output of your rotary converter is exactly the same as indicated on this nameplate.

No. 12—The main line switch controls the alternating current entering the cabinet. When the white button is down, the current is on, that is, the switch is closed. When the black button is down, the current is cut off. This switch is made with the contact bars fully twice the required size for an apparatus of this nature, and this extra material is merely furnished to insure long life.

No. 13—A foot switch is an absolute necessity when performing electrocoagulation operations, and for certain other diathermy and high frequency work. The foot switch terminals are placed in the outlets No. 13, and the circuit is closed by pressing on the foot plate instead of closing switch No. 12. Switch No. 12 is left in the "off" position when the foot switch is employed.

No. 14—This fuse offers protection to the milliampere meter should you accidentally, or otherwise, pass too heavy a current through with the wrong setting of selector No. 6, or by possibly touching your electrodes or cord tips together. This fuse will blow out when approximately 1,500 milliamperes are reached with the lower scale (1,000 M. A.) adjustment. Inside the cabinet a coil is connected across this fuse circuit which carries the current after the fuse is blown, preventing the peak voltage from rising to a dangerous point and giving the patient a momentary shock, and keeps the current output within safe limits through the meter. While the fuse will glow to a dull red heat when the 1,000 milliampere point is reached on the lower scale, and 4,000 M. A. on the upper scale, it will not blow out under a 50% overload.

✦ ✦ ✦ ✦

Medical Diathermy is obtained as follows: Set the indicator on the auto transformer control No. 10 on one of the lower settings (2, 3 or 4). Close the spark interrupter points No. 8 (these points should come together evenly). The rubber-covered connecting cords are used to make connections from the diathermy electrodes, which electrodes are selected to suit the individual case, to either outlets 1 and 2, 1 and 3 or 1 and 4, depending on the current output desired.



No. 1334 Cords

All tissue offers some resistance to the discharge of the diathermy current, and the greater the resistance the greater the voltage that must be employed to overcome it. Hence, outlets 1 and 4 will be suitable for very light work, 1 and 3 when the part to be treated is not very heavy, or the electrodes placed not too far apart, and 1 and 2 outlets for the heavier parts of the body.

For the initial test, we suggest placing one cord tip into outlet 1, and the other into outlet 3. The other ends of the cords are slipped in the electrode clips, which in turn are fastened to the selected electrodes; we will substitute a bowl of salt water for the patient. Cut off two small pieces of sheet block tin electrode material, and attach them to the cords with the clips (catalog No. 868). Place these two pieces of metal into a bowl of brine, and see that they do not come closer than one inch one to the other. Close the line switch No. 12 and gradually open the spark interrupter points No. 8 until the meter needle shows movement. As the spark points are separated, the milliampere reading will increase. Advance controller No. 10 another point, and further separate the spark points. Decrease and increase the volume of current generated by altering both of these controllers Nos. 8 and 10, until you become thoroughly familiar with the controlling procedure. It would be well to try this a number of times with different sizes of electrodes, by using stronger and weaker brine solutions, that is, with lesser and greater resistances, until you become thoroughly familiar as to how much each individual maneuver affects the current output.



No. 692 Block Tin



No. 868
Mesh Electrode Clamp

Now try outlets 1 and 2 in combination, and you will find that as you decrease and increase the resistances of the water medium and try various settings of the auto control No. 10, and bring together and separate the points on the spark gap, the readings will be quite different as compared to the amount of current generated when employing outlets 1 and 3.

Then try outlets Nos. 1 and 4 in combination, and you will find the results again quite different as compared to 1 and 3 and 1 and 2. It is inadvisable to apply the electrodes to the patient until you have become thoroughly familiar with the apparatus, have studied the instruction book, "Diathermy Therapy," or have had suitable instructions from one who knows the apparatus.

When making the above tests, be sure that your meter selector switch No. 6 is set to the 4,000 point. Then, after you have made a few tests and wish to try out lower milliamperage readings, you may set the indicator to point 1,000.

To Obtain Electro-Coagulation (Surgical Diathermy) Current Set the indicator on the auto transformer control No. 10 on one of the lower settings (2, 3 or 4). Close the spark interrupter points No. 8 (these points should come together evenly). The rubber-covered connecting cords are used to make connections from the diathermy electrodes which electrodes are selected to suit the individual case, to outlets 1 and 4.

Here, again, the item of tissue resistance must be taken into consideration, and the voltage outlets selected to suit the individual operator. Ordinarily terminals 1 and 4 supply the proper voltage, although 1 and 3 at a slightly higher potential, may be required for some work. The voltage as supplied from outlets 1 and 2 is rarely necessary for surgical procedure.

It is customary when speaking of electrocoagulation technic to refer to the *active* and *indifferent* electrodes; the active electrode being the small point or disc which is placed in direct contact with the diseased tissue, and the latter (the indifferent electrode), the larger metallic plate to cover a great deal of skin surface to prevent heating sufficient to destroy healthy tissue, is placed preferably on the opposite side of the body or at least adjacent to the point of operation.

A piece of raw beef on a flat plate of block tin will best serve as the patient for the preliminary test. Grasp the insulated handle of the active coagulation electrode No. 862 at least 2 inches away from the metal end and preferably with the flexible connecting cord passing over the back of the hand. A foot switch should be employed for this work. Stepping on the foot switch closes the circuit; or if the foot switch is not employed, close line switch No. 12. Open the spark interrupter points slightly, bring the point of the active electrode down to the meat, and you will observe sparks from the point of contact and some small reading on the milliampere meter. Never fail to have meter selector indicator No. 6 either on "off" or 4,000 positions; never on the 1,000 point, as surgical work calls for very heavy current discharges, and if you leave this selector connected to the wrong scale, you are liable to burn out the meter.



No. 862
Electrocoagulation Electrode

Press the needle-point electrode into the meat to different depths; increase and decrease the current by adjusting the spark interrupter points, and vary the voltage with the controller No. 10. Observe how the milliamperage will vary with these different settings. Now hold the electrode away from the meat a short distance, to cause sparking. You will find after making a series of these tests that you can produce varied depths of desiccation, coagulation and blanching at will. It is absolutely necessary that a series

of experiments along this line be made, that you may thoroughly familiarize yourself with the current action before trying applications on living tissue. When once fully conversant with the apparatus, the required currents for various degrees of coagulation, etc., we suggest that meter selector switch indicator remain at the "off" point; that is, the meter cut out of the circuit entirely, as then should you accidentally touch your electrodes one to the other, your meter would not be damaged.

To Obtain D'Arsonval Autocondensation Current Have the current control indicator No. 10 set on point 5. Place selector No. 6 on the 1,000 mark, as autocondensation treatment readings rarely exceed 800 milliamperes. Close the spark interrupter points No. 8. The autocondensation pad is connected by means of one of the rubber-covered cables to outlet No. 2. The patient should recline comfortably on this pad, and either no pillow employed or one that is quite thin, the object being to keep the patient's entire body, even the head, as close to the pad as possible. Connect other rubber-covered cable from outlet No. 1 to the long nickel-plated handle, which handle should be held firmly in the patient's two hands. Always place a heavy folded towel or other similar insulating medium between the body and the hands, to prevent any possible leakage from the handle to the body. Some operators prefer employing an electrode of block tin placed either on the abdomen or chest instead of this No. 81 handle, and the technic is a matter of choice. Close switch No. 12 and gradually open the spark interrupter points No. 8 until a smooth flow of current is obtained, but never so far that the discharge becomes noisy or uneven in character.



No. 418 Autocondensation Pad



No. 81
Autocondensation Handle

The current volume is increased and decreased by means of the auto transformer control No. 10, as well as the spark interrupter points. The distance between these points should be adjusted equally. Now have the patient rise up slightly with the current on, and observe how the reading on the milliampere meter varies as the body moves away from the pad, that is, away from the charged field. This is simply to prove to you that for maximum current effect the patient must remain close to the pad.

Indirect Diathermy This is the title given by certain operators to a slight modification of the autocondensation treatment, that is, where the indifferent electrode is the autocondensation pad and the active electrode a plate of block tin.

Unipolar High Frequency Application Set the indicator No. 10 on any one of the lower settings (2, 3, or 4), and close the spark interrupter gap No. 8. Connect the heavy insulated cable No. 83 to terminal No. 7, and to the high frequency handle. A glass electrode, either vacuum or non-vacuum type, should be held firmly in the handle clamp. As the milliampere meter No. 5 is not used in connection with this unipolar discharge, the setting of meter selector No. 6 is immaterial. Close switch No. 12 and gradually open the spark interrupter points, and increase the voltage by means of controller No. 10 until the desired amount of current is obtained through the bulb.



No. 9 High Frequency Electrode

Indirect High Frequency Applications are obtained from the same current as used for exciting the glass electrodes, directly from uniterminal No. 7, but the application is reversed. Instead of connecting the heavy cord No. 83 from uniterminal No. 7 to the high frequency handle or to the electrode direct, the current is sent through the patient by means of the metal handle No. 81. The patient grasps the No. 81 handle firmly (which is directly connected with the heavy cord to terminal No. 7), the current is turned on and regulated as for high frequency, and the discharge is withdrawn from the body with the operator's fingers at the point desired.



No. 83 H. F. Cord

Desiccation has been referred to in the past as "fulguration," and refers to a dehydrating process similar to a minor application of electrocoagulation current. The discharge is monopolar (the bipolar teclnic is referred to as electrocoagulation). The current is taken from the uniterminal No. 7 and is regulated by means of controller No. 10 and spark gap No. 8. This current is not measured by the milliampere meter; hence the setting of indicator No. 6 is immaterial.

Indirect Desiccation or as it has formerly been referred to "indirect fulguration," is obtained in exactly the same manner as the indirect high frequency discharge, only instead of the fingers withdrawing the current in a mild manner at the spot desired, a pointed electrode of metal is employed. This electrode must not be insulated, but the bare metal is held in the operator's fingers. The current may be extracted from the patient from a very limited area, and the effect may be one of extreme heat or merely sparking, at the will of the operator. Sufficient current to desiccate or to dehydrate only, is employed. The setting of the

spark gap No. 8 is very important in this treatment, to avoid passing too much current.

Foot Switch For all electrocoagulation work, and in many instances for medical diathermy applications, a foot switch is quite necessary. The metal ends on the foot switch connecting cable are plugged into the two openings protected with rubber bushings on the left side of the cabinet. When the foot switch is pressed, it closes the circuit in place of line switch No. 12. You may leave the foot switch connected to the cabinet at all times and simply use the line switch as desired, pulling out the foot switch from under the cabinet when you wish to use it.



No. 1205 Foot Switch

CAUTIONS

Always be sure that line switch No. 12 is open, and that pilot light No. 9 is out before leaving the cabinet.

Always observe the setting of voltage control No. 10 before turning current through patient. Treatments should start with a minimum discharge and be increased gradually to maximum.

Always observe the position of the spark interrupter points on gap No. 8 before closing the circuit to the patient. These points should be closed, or nearly closed, before the current is turned on, and opened gradually to the desired milliamperage.

Do not permit electrodes or cord tips to touch one another with the current on. This creates a dead short circuit, and will undoubtedly burn out your milliampere meter.

Glass electrodes often crack after a treatment when laid against a cold surface. Bursting is caused from sudden shrinking at the point of contact.

Dust your spark gap frequently. Dust forms a partial conductor and must be removed. Clean metal surfaces on all parts of the gap radiate heat much more readily than dirty ones. Keep the gap clean.

Never leave your machine for a long period with the current on. If the outfit is not to be used for some hours, as for instance over night, the safest procedure is to cut off the current where your connecting cable is attached to the line wiring.

Never connect this apparatus to any other line current than that plainly indicated on the nameplate.

Now, last but by no means least, read the book on operating technic, or as we term it, "Diathermy Therapy" form No. 535, from cover to cover. It was written for you, Doctor, and the contents were carefully checked over. It should prove of valuable assistance to you.

INSTALLING AND OPERATING

Instructions

for the

FISCHER PORTABLE DIATHERMY APPARATUS

TYPES "G" and "GP"

H. G. FISCHER & CO., Inc.

Physical Therapy Headquarters

2323-2337 Wabansia Avenue CHICAGO, ILL.

Form No. 534A

How to Get Here:

DRIVING — Follow Washington Blvd. west to Oakley Blvd., north on Oakley to Wabansia Ave., and one block west, or

BY ELEVATED—Take the Humboldt Park "L" to Western Avenue Station, walk one block north to Wabansia Avenue and a short block east to Claremont; or

BY SURFACE CAR — Western Avenue to Wabansia Avenue, and one block east to Claremont.

INSTALLING AND OPERATING INSTRUCTIONS

for the

FISCHER

PORTABLE DIATHERMY APPARATUS

Types "G" and "GP"

H. G. FISCHER & CO., Inc.

Manufacturers of

X-Ray and Physiotherapeutic Equipment

2323-2337 Wabansia Ave. Chicago, Illinois

PHONES ARMITAGE 0122—0123—0124—0125

Introduction

The contents of this small booklet were compiled to assist the operator of the Types "G" and "GP" Apparatus in acquainting himself with the various working features of the machine.

Therapeutic treatment technic will be found in Special Pamphlet Form 535.

In producing this booklet extreme care was exercised in simplifying in every possible manner, and, with the suggestions scattered throughout, you should be able to proceed without trouble. Please take sufficient time to read them carefully, and when in doubt kindly consult the proper page before registering complaint.

H. G. Fischer & Co., Inc.



The Fischer Hospital Diathermy Unit
Catalog No. 1250
Mounted on Walnut Cart, No. 1255

The Meter is of the D'Arsonval "dead-beat" type with double calibrations—0 to 1000 and 0 to 4000 milliamperes. This type of meter is employed that readings of small or medium currents may be just as accurately observed as the heavier discharges.

Always use the upper scale for currents to exceed 900 M. A. although there is a safety element in this meter which will withstand a 100% overload.

Do not use the lower scale for readings to exceed 800 or 900 M. A., to prevent overloading and possible burn-outs which will likely occur if too great currents are passed with the plug in the lower hole in dial No. 6.

Should the meter needle fail to go back all the way to zero, there is a small adjusting screw coming through the glass top, which, when turned to the right or left, increases or decreases the spring tension, and the needle moves either way.

In the event that your conducting cords have crossed, with the current on, or that the electrodes have touched one another and the meter has burned out, simply place the plug in the center (cut-out) hole in dial No. 6, lift the meter off the outfit with a straight upward pull, and send the meter to us. We will send you a new meter at once, but you may use the outfit until this new meter arrives, using the cut-out as above, although it will be necessary to guess at the amounts of discharge employed.

The Multiple Spark Gap The spark interrupter points are the most important regulating feature on the outfit. Their function is to regulate the discharge of the high tension current in connection with the control lever No. 10, and may be adjusted with the current on. When these spark interrupter points are closed, there is a direct short circuit on the transformer and no discharge from any of the high tension outlets.

As these points are gradually separated, the high tension current passing across the gap produces an oscillating or vibratory effect which is increased up to that point where the voltage is insufficient and the sparking ceases. The highest rate of oscillations—that is, the highest frequency of discharge is obtained with the points nearly closed; also the very smoothest current flow.

More milliamperage is obtained by separating the points by turning the control knob to the left, up to the point where they become too widely separated that the voltage is insufficient to span the gap, in which event the machine ceases to function. Should this stopping occur, simply bring the points closer together, and the sparking will be resumed.



The Fischer Physician's Portable Diathermy Unit

Catalog No. 1245

Introduction

The contents of this small booklet were compiled to assist the operator of the Types "G" and "GP" Apparatus in acquainting himself with the various working features of the machine.

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H. G. Fischer & Co., Inc.



The Fischer Hospital Diathermy Unit
Catalog No. 1250
Mounted on Walnut Cart, No. 1255

EXPLANATION OF DIAGRAM ON OPPOSITE PAGE

No. 1—This Terminal forms one outlet for all three Diathermy circuits, and must always be used with one of the other three (low voltage, medium voltage, high voltage) Diathermy outlets.

No. 2—Highest voltage Diathermy terminal. To complete circuit to patient use outlets Nos. 1 and 2.

No. 3—Medium voltage terminal. To complete medium voltage circuit to patient use outlets Nos. 1 and 3.

No. 4—Lowest voltage terminal. To complete circuit to patient use outlets Nos. 1 and 4.

No. 5—Double Scale Milliamperemeter: 0 to 1000 M. A. lower scale to be used for measuring small amounts of current, and the 0 to 4000 M. A. scale for the heavier discharges. (See paragraph on Meter for further information.)

No. 6—Control Plate for No. 5 Meter. For reading of current discharge up to 1000 M. A. only place plug in lower hole. Place plug in upper hole for reading of heavier currents. Use caution when using lower scale, as should your cords or electrodes touch one another, and create a short circuit the meter is apt to burn out. The outfit may be operated without the meter by placing the plug in the center hole marked "cut-out."

No. 7—High Tension, High Frequency Tesla Pole; for uni-polar discharge only. Not to be used in connection with any other outlet.

No. 8—Multiple Spark Gap. Tungsten points may be adjusted individually. One, two or three sets can be in action at one time, depending on the output desired.

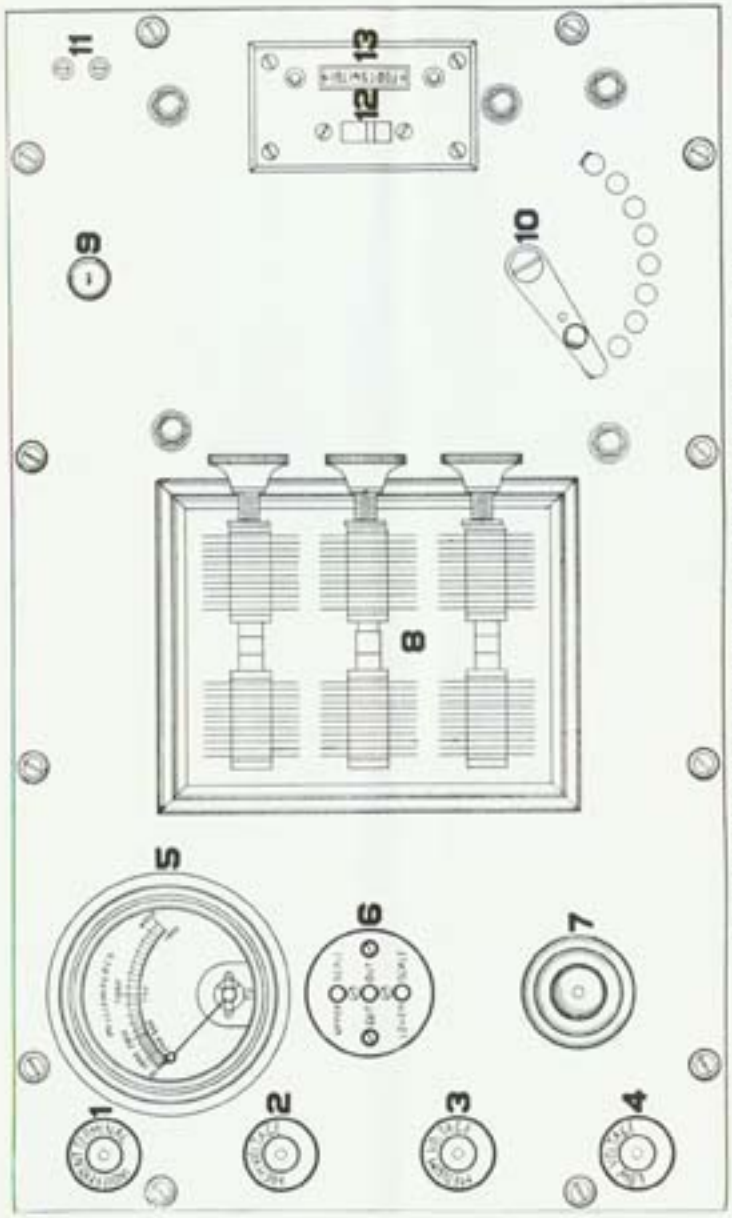
No. 9—Pilot Lamp. Indicates current on or off.

No. 10—Main Controller. For weakest discharge place lever to left; for strongest current, place lever to right.

No. 11—Line connection. Port of entry for 110 Volt 60 Cycle Alternating Current.

No. 12—Main Switch. Button to right, and white dot showing, current **on**. Button to left, current **off**.

No. 13—Terminal outlets for Foot-switch. When using Foot-switch, leave main switch No. 12 in the OFF position.



Instruction Sheet for Type "G" Portable Diathermy Outfit.

The Meter is of the D'Arsonval "dead-beat" type with double calibrations—0 to 1000 and 0 to 4000 milliamperes. This type of meter is employed that readings of small or medium currents may be just as accurately observed as the heavier discharges.

Always use the upper scale for currents to exceed 900 M. A. although there is a safety element in this meter which will withstand a 100% overload.

Do not use the lower scale for readings to exceed 800 or 900 M. A., to prevent overloading and possible burn-outs which will likely occur if too great currents are passed with the plug in the lower hole in dial No. 6.

Should the meter needle fail to go back all the way to zero, there is a small adjusting screw coming through the glass top, which, when turned to the right or left, increases or decreases the spring tension, and the needle moves either way.

In the event that your conducting cords have crossed, with the current on, or that the electrodes have touched one another and the meter has burned out, simply place the plug in the center (cut-out) hole in dial No. 6, lift the meter off the outfit with a straight upward pull, and send the meter to us. We will send you a new meter at once, but you may use the outfit until this new meter arrives, using the cut-out as above, although it will be necessary to guess at the amounts of discharge employed.

The Multiple Spark Gap The spark interrupter points are the most important regulating feature on the outfit. Their function is to regulate the discharge of the high tension current in connection with the control lever No. 10, and may be adjusted with the current on. When these spark interrupter points are closed, there is a direct short circuit on the transformer and no discharge from any of the high tension outlets.

As these points are gradually separated, the high tension current passing across the gap produces an oscillating or vibratory effect which is increased up to that point where the voltage is insufficient and the sparking ceases. The highest rate of oscillations—that is, the highest frequency of discharge is obtained with the points nearly closed; also the very smoothest current flow.

More milliamperage is obtained by separating the points by turning the control knob to the left, up to the point where they become too widely separated that the voltage is insufficient to span the gap, in which event the machine ceases to function. Should this stopping occur, simply bring the points closer together, and the sparking will be resumed.



The Fischer Physician's Portable Diathermy Unit

Catalog No. 1245

The reason for the current stopping is that the voltage is insufficient to carry across between the points. Increase the voltage by moving controller No. 10 to the right. You will find that with the lever on point 2 the spark points may be separated somewhat more than with the lever on point 1; that the distance between points and the volume of milliamperage is further increased by advancing lever No. 10 to points 3, 4 or 5.

A nearly closed spark gap and control lever No. 10 on point 1, is just as faulty operating technic as to try operating with No. 10 on point 1 and opening the spark points too far. *Increase one proportionately with the other.*

An individual pair of points, only, may be employed for the very lightest currents, or two pairs, or all three, if adjusted close together. For the best, most uniform discharge we recommend using all six spark interrupter points wherever possible.

You will notice the exceptionally heavy copper flanging for carrying away the heat produced at the sparking points. This insures almost endless life to the gap, itself, and permits practically constant operation of the entire unit.

The contact points are made of pure electrically welded *tungsten;* the hardest and most durable material available for this purpose. They need no attention whatever. They will not pit, become corroded, or with just ordinary care, need any adjustment; and if you have ever operated any other type apparatus you will appreciate what this means—to have spark gap trouble entirely eliminated.

Controller No. 10 That the currents generated by this apparatus may at all times be perfectly resonant, it is necessary that the voltage input to the main transformer be altered in proportion to the milliamperage desired and the proper operation of the spark interrupter points. Lever No. 10 has this function.

Don't attempt to obtain the maximum Diathermy current, for example, with control No. 10 on button 1 (point farthest to left) and by opening the spark interrupter points. Start the machine with lever No. 10 on point 1, and the spark interrupter points nearly closed. Separate the tungsten points gradually, and one pair at a time, keeping the sparking surfaces about equal distance apart. You will find that shortly the current discharge will become unsteady, and if you continue to separate the points the current will cease to pass altogether. See paragraph No. 9 for correct technic.

Main Switch No. 12 controls the entire current entering the cabinet. With the switch lever pushed forward, the current is *"off."* The *"on"* position is indicated when the lever is pushed to the back, with a small white dot on the black button itself.

The Pilot Lamp unless broken or burnt out will indicate when the current is entering the machine. Never leave the apparatus with the pilot lamp burning, as although the machine will operate for a hundred hours at one time on test, it is not advisable to run unnecessary fire risk. Also, the current consumption from your line, if the machine is allowed to remain "on" over night, will be considerable.

Highest Voltage Diathermy Outlet This terminal (outlet No. 2), in combination with outlet No. 1, delivers the highest voltage Diathermy and Auto-condensation current. Voltage is required to overcome resistance in the body—that is, while a low voltage will prove quite sufficient to overcome the resistance through the hand, wrist or ankle, correspondingly higher voltages are necessary for successfully treating heavier parts. Select the voltage outlet to suit the individual case and treatment.

Medium Voltage Diathermy Outlet See paragraph No. 18. A higher milliamperage will be obtained from this outlet (No. 3) in combination with outlet No. 1, than from No. 2, because the potential is lower—the output in actual watts remaining approximately the same.

Lowest Voltage Diathermy Outlet Mainly to be employed where the body resistance is not great; in other words, for treating the thinner parts and for Electro-coagulation. Use outlets No. 1 and No. 4 in combination.

The Tesla High Voltage Terminal is to be employed in connection with mono-polar discharges only: High Frequency vacuum and non-vacuum electrodes, fulguration, mono-polar desiccation, etc. The voltage from outlet No. 4 is the highest obtainable from this outfit, the frequency exceedingly high, but the current volume as measured in milliamperes quite low.

The Foot Switch Both of the operator's hands are usually occupied during Electro-coagulation procedure, and sometimes for indirect High Frequency and Diathermy work, and the foot switch (Cat. No. 1205) is positively essential.



Catalog No. 1205

The terminals on the end of the foot switch cable are set into the openings in the fibre block at No. 13. When the foot switch is to be employed the line switch No. 12 is left in the OFF position. Pressing down on the foot switch closes the circuit and starts the current through the machine.

This Portable Type "G" Apparatus, unless plainly marked otherwise on the name plate, is constructed to operate from an *alternating current line of from 105 to 120 volts, 60 cycles,* which line must be capable of carrying *10 amperes.*

Remove all cords, electrodes or any loose pieces from the top of the apparatus.

See that the button on the main switch No. 12 is pushed forward—the OFF position. (When this switch lever, or button, is pushed to the back a white dot is seen; indicating a *closed* circuit.)

Place the fibre connector on the end of the green connecting cord over the two plugs No. 11. Screw the plug on the other end of the green cord into a lamp socket *on an alternating current line*, as above, turn on the current at the key switch, and your machine is ready for operation.

EXAMPLES FOR OPERATION

To Obtain Medical Diathermy Set lever No. 10 on point 1 (farthest to left). Close spark interrupter points No. 8. Be sure the main line switch No. 12 is in OFF position. Place the plug in upper-scale hole in dial No. 6. The rubber covered cords, Catalog No. 1330G, are used to make connections from the Diathermy electrodes to the outlets on the cabinet.



No. 1330 Cords

For the first test, place one cord tip in the outlet No. 1 (other ends of cords to electrodes), and other cord tip in outlet No. 3 (medium voltage terminal). We will substitute a glass or bowl of salt water for the patient.



No. 692 Block Tin

Clip off two small pieces of sheet block tin electrode material and attach the clips, Catalog No. 868. Clamp the cord tips in the clips, and drop the pieces of metal into the brine, being sure they do not touch one another.

Close switch No. 12, and gradually open one pair of spark interrupter points until the needle on the meter moves upward. As the points are separated the reading will increase. Open another set of points; and the third set. Try various setting of the lever No. 10. Increase and decrease the current as registered on the meter several times, until you become somewhat familiar as to how much each maneuver affects the current output.

This is like trying out a new car: you sit in the driver's seat and try shifting the control levers, locate the hand and foot brakes, the accelerator, etc., etc., before actually getting on the road.

Almost close the spark interrupter points No. 8; set the control No. 10 on point 1, and place the plug in the lower hole in dial No. 6. The deflection of the needle is obtained with a great deal less current, but the readings are only one-quarter as great in millis.

Also try the other diathermy outlets Nos. 2 and 4, and observe the different effects at different pressures and volumes of current.

Don't attempt to apply the electrodes to a patient (or yourself) until you either read the instruction book form No. 535 or have had instructions from one who knows the apparatus. *Read booklet form No. 535 first!*

How Operate for Electro-Coagulation Close spark interrupter points No. 8. Be sure the main line switch No. 12 *is open*. Set lever No. 10 on button 1. Have the plug in the upper-scale hole in dial No. 6.

Attach one of the rubber covered diathermy cords (Catalog No. 1330) to outlet No. 1, and other end to a piece of block tin about 6 inches to 8 inches square.

Connect tip on end of flexible cord which is permanently mounted to the plank electrode (Catalog No. 862), into outlet No. 4. Slip any one of the three aluminum tips into this handle.



Catalog No. 862

Lay a piece of raw meat on the flat plate, to serve as the patient for the preliminary test.

Hold the hard rubber handle about in the center, with the flexible connecting cord passing back over the hand.

Connect terminals on foot switch connecting cord to the outlets No. 13, and you are ready for a test.

Open one pair of spark points a slight bit, step on the foot switch to close the circuit (the switch No. 12 is left in OFF position when using the foot switch), bring the point of the Plank electrode down to the meat and you will observe sparks at the point of contact, and a meter reading.

Increase and decrease the current by adjusting the points back and fourth, using one pair, two, and all three; alter the setting of lever No. 10; watch how the meter reading varies with the different settings; hold the electrode tip away from the meat a short distance; make contact; press the tip into the meat; or to be brief, try a series of experiments along these lines to familiarize yourself with the current action, coagulating depth, etc., etc.

Place the plug in the center (cut-out) hole in the dial No. 6, and observe that the meter is "dead." *Don't have plug in lower hole (fine lower scale reading on meter) when doing electro-coagulation work.* The danger of short circuit and consequent burn out of the meter is too great.

Try outlets Nos. 2 and 3, in combination with No. 1 and observe the current action is quite different when employing varying voltages (pressure) and milliamperages (volume).

Then turn to form No. 535 for further information on this subject.

To Obtain D'Arsonval Auto-Condensation

First—*always*—see that the switch No. 12 is in OFF position.

Set lever No. 10 on point 2.

Close the spark interrupter points No. 8, and open each pair about ¼ turn.

Place plug in lower hole in dial No. 6. Place the flexible pad (Catalog No. 418) on an ordinary table, and connect same with one of the No. 1330 rubber covered cords to outlet No. 1.



No. 418

The patient should be reclining comfortably on this pad, and if pillow is used it should be placed under the pad in preference to immediately under the patient's head, because in the latter event too much of the body is too far removed from the electrode in the pad itself.

Connect other rubber covered cord from outlet No. 2 to the long nickel-plated auto-condensation handle (Catalog No. 52), which handle is to be held firmly in the patient's two hands.



No. 52 Handle

Close switch No. 12, and gradually open the spark interrupter points No. 8—not too far that the discharge becomes noisy or uneven in character. Open switch No. 12.

Current is increased by advancing lever No. 10, and by opening spark interrupter points No. 8.

A further test is to have the patient lean forward, with the current on, and observe how the reading on the milliampere meter varies as the body moves away from the auto pad—away from the active charged field. This is simply to prove that for maximum current effect the patient must remain close to the pad.

Employing outlets numbers 3 and 4 in combination with No. 1, in place of outlets numbers 1 and 2 will also produce auto condensation current, but because of the lower voltage the discharge is not as effective.

To Excite Glass High Frequency Electrodes

Set lever No. 10 on point 1 (farthest to left). Close spark interrupter points No. 8 by turning the black regulating knobs to the right. Be sure switch No. 12 is in OFF position. Connect the heavy insulated cable (Cat. No. 83) to the post No. 7, and to the small ring on the ends of the High Frequency electrode, Catalog No. 9.



No. 83. H. F. Cord



No. 9

The setting of plug No. 6 is immaterial when using the high tension pole No. 7.

Close switch No. 12, and gradually open one set of spark interrupter points until the desired amount of current is obtained. Current volume is increased two ways: by opening the spark interrupter points, and by advancing lever No. 10. To prevent pitting and roughening the contact points under lever No. 10 it is advisable to cut off current entering cabinet at switch No. 12 before shifting this lever.

(See Form No. 535 for further instruction on this subject.)

For Indirect High Frequency

Follow instructions as for exciting the glass electrodes for the setting of controls, but reverse the application.

Instead of connecting the black insulated cord from pole No. 7 to the high frequency handle, hook it onto the all-metal handle, Catalog No. 52. The patient grasps this handle firmly, the current is turned on and regulated as for "high frequency," and the discharge taken *from* the body with the operator's fingers at the point desired.

This subject is further covered in form No. 535.

Indirect Fulguration

is obtained in exactly the same manner as the indirect high frequency discharge, only, instead of the fingers withdrawing the current in a *mild* manner at the point desired, a pointed metal electrode is employed. Thus the current is extracted at a very limited area and the effect is one of extreme heat at the point of contact—enough to desiccate, to dehydrate, or even to coagulate when sufficient current is used.

* * * * * * * * *

The Types "G" and "GP" Portable Diathermy Units are constructed with precisely the same electrical elements. They embody the very latest and most approved methods of generating High Frequency currents. They are exceedingly durable in construction, well balanced, and with just ordinary care will last many years. No attention is required except to keep the apparatus reasonably clean and free from dust.

Should you, by reason of misfortune, burn out the Milliampere Meter, lift same off the unit with a straight upward pull, place the plug in the center (cut-out) hole in dial No. 6, and go ahead using the outfit; estimating, for the time being, the volume of currents delivered. Send the meter into our factory by special delivery parcel post, and we will make replacement immediately.

CAUTIONS!

Always shut off circuit switch No. 12 before changing any connections.

Do not permit electrodes to touch with the current passing. This creates a direct short circuit and is apt to burn out the milliampere meter.

Dust the spark interrupter flanges occasionally. Clean surfaces radiate heat much more readily than dirty ones.

Don't give treatments requiring heavy discharge with the plug No. 6 set in the lower hole, and using the correspondingly lower meter scale.

Don't leave your machine for a long period with the current on. If the outfit is not to be used for some time, as for instance, over night, the safest procedure is to cut off the current where your connecting cord is attached to the line wiring.

Never connect this apparatus to any other current than that plainly indicated on the name plate.

Indications for Diathermy

Abstracts and Digests from Recent Literature

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(Second Edition)

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GENERAL MEDICINE

Diathermic Treatment of Abdominal Pains. By L. Delherm and A. Laquerriere in *Paris Medical*, 1:369: April 20, 1929.

Abst. in Jour. A. M. A., 92:26:2197: June 29, 1929.

On the basis of their own experience in more than 100 cases and of the results reported by other authors, Delherm and Laquerriere come to the conclusion that diathermy in the form of thermopenetration is a valuable therapeutic method in the treatment of abdominal pains, especially the pains caused by adhesions and periviscervitis. Only exceptionally is it badly tolerated by the patients; usually it gives good results (cure in more than 37 per cent), even in patients who have been treated by repeated surgical interventions for a long time and without avail. Good results of the treatment are explained more by a decrease in the congestion than by the resorption of the adhesions, because a considerable difference was not observed between the roentgenograms taken before and after the treatment in the cases of a complete cure. However, the authors think that diathermy cannot be completely substituted for the other methods of electrotherapy or radiatherapy.

The Treatment of Cancer of the Skin With X-Rays, Radium and Electrocoagulation and Their Special Indications. By G. E. Pfahler, Philadelphia, *M. J. & Rec.*, Vol. CXXVIII, No. 6, September 19, 1928. Page 263.

This author says: "In the treatment of the general epitheliomata about the skin anywhere on the body, the destruction of the lesion by electrocoagulation and associated with x-ray treatment will give the quickest and most satisfactory results when such destruction is practical. We should obtain practically one hundred per cent of cures."

Some Facts About Chronic Constipation. William Wolf, M. D., Sc. D., *Medical Review of Reviews*, October, 1927. Page 459.

This author says under his remarks about the treatment by electrical stimulation that "no single method of treatment of constipation has given better or as good results when properly employed than the so-called sinusoidal stimulations in their various modalities, either alone or combined with other electrical modalities, notably diathermy and static electricity.

What Not to Do with High Frequency Currents (Diathermy). By Frederic de Kraft, M. D., New York City, in *Physical Therapeutics*, Vol. XLVI, No. 11, November, 1928. Page 513.

"It is not wise to apply diathermy soon after a heavy meal, for the reason that it is difficult to apply even a strictly local application to a part without some constitutional effect.

"We should bear in mind that it is not the meter reading that determines the actual conversion of the current into heat. The specific resistance of the part determines largely the amount of current converted into heat.

"It is always wise to watch closely during the first treatment those patients who have not been accustomed to the application of diathermy currents. Moderate currents should be used at first.

"The heat produced by a high frequency current in its passage through the body or a part of it stimulates the heat regulating apparatus of the entire system. The more intense the heat effect the greater and more rapid the flow of blood. This greatly increased flow of blood is for cooling purposes primarily.

"Stronger currents applied to a limb whose blood vessels are markedly sclerotic will certainly increase existing discomfort and pain.

"A patient who has been treated on the autocondensation couch or has had a sufficient amount of diathermy currents by the plate method to arouse the autonomic regulating centers of heat, should not be allowed to leave your house immediately nor to engage in any physical exertion. He should remain long enough to allow complete cooling off.

"Prepare a patient who is about to receive his first treatment by describing the sensation he should receive, namely that he should experience no other sensation than a gentle warmth.

"Avoid intensive diathermy application to the sinuses, if their drainage is inadequate."

Use of Diathermy in Diseases of Gastro-Intestinal Tract. By H. S. Lurje in *Archiv. f. Verdauungskd.*, 45:224: April, 1929.

Abst. Jour. A. M A., 93:8:654: August 24, 1929.

Lurje states that in diseases of the gastro-intestinal tract diathermic treatment does not modify the acidity of the gastric juice (in determinations of the free hydrochloric acid and the total acidity). In the great majority of cases of gastro-intestinal disturbances, however, the subjective condition of the patient is improved by diathermic treatment. The author believes that diathermy should be used more extensively in the treatment of diseases of the gastro-intestinal tract.

Acute Local Infection Treated by Heat and Radiant Energy. F. de Kraft and others. *Physical Therapeutics*, Baltimore, April, 1927.

Abst. J. Am. M. Assn. (July 9, 1927).

Certain local infections may become virulent in type, spreading rapidly and endangering life. In cases of this extreme type, de Kraft et al. assert that prompt utilization of various rays of the spectrum—high degree dry heat, radiant light and heat, diathermy, ultraviolet rays and roentgen rays—has proved effective.

Shortening Disability Time in Industrial Accidents. G. W. Edgerton, M. D., San Benito, *Medical Record and Annals*, May, 1928. Page 99.

This author says in conclusions that "properly applied physical measures will shorten the elapsed time from injury to function in many of the problems presented by industrial accident surgery.

"Physical measures are only added as a stimulant or to aid natural resources when there is not enough local reaction or fight to complete healing."

Treatment of Multiple Sclerosis by Diathermy. J. W. Stephenson. *Physical Therapeutics*, Baltimore, April, 1927.

Abst. J. Am. M. Assn. (July 9, 1927).

Stephenson reports five cases of multiple sclerosis that he treated by diathermy. In two of the cases, during the course of treatment, there were distinct evidences of exaggeration of symptoms referable to morbid changes within the cranial cavity, without evidence of an increase of the symptoms referable to spinal cord involvement. Stephenson believes that this argues strongly for at least a control of the spinal cord disease by diathermy.

Physical Therapy in Nervous and Mental Diseases. *Atlantic Medical Journal*, Harrisburg, Pa., 31:529-624 (May), 1928.

Abstract in The Journal of the American Medical Association, Vol. 91, No. 1, July 7, 1928. Page 56.

"The danger in the use of physical therapy in nervous and mental diseases, in Mitchell's opinion, lies in the tendency of the patient, and in some instances of the physician, to place too much confidence in it. If the physician puts all his faith in it and feels that it absolves him from the necessity of other forms of therapy he will surely fail. Physical therapy is safe only when it is used with a clear understanding that help and not a cure can be expected. Viewed in this light and used with this understanding, it is a valuable asset in the management and treatment of a large percentage of mental and nervous diseases."

Physical Measures in General Practice. By Richard Kovacs, M. D., New York, N. Y., *New York State J. Med.*, Vol. 28, No. 15, August 1, 1928. Pages 909-914.

Under "Thermal Measures" this author says:

The local application of heat is indicated in a host of traumatic conditions, such as contusions, sprains, fractures, traumatic arthritis and myositis, and in inflammatory or infectious conditions such as boils, abscesses, conjunctivitis, coryza, sinusitis, otitis media, bronchitis, local septic infections, various forms of arthritis, endarteritis, neuritis.

Radiant Light and Heat.—The reflected energy of an incandescent bulb. No physician's office nowadays should be without one of these inexpensive devices.

Other types of apparatus for local application of surface heat include dry hot air ovens and also whirlpool baths. The former

are expensive, complicated and dangerous to handle although, on account of the increased skin toleration towards dry hot air, better results are claimed. Diathermy has given better and easier results, however, when properly applied. Hot whirlpool baths consist of water at a temperature from 100° to 110°, rapidly agitated in a container by its own pressure or by compressed air or by a suitable motor. Such whirlpool baths furnish a combination of heat and gentle massage and improve local circulation effectively in conditions of peripheral nerve injuries, indolent ulcers, adherent scars, osteomyelitis of terminal phalanges, as well as in recent fractures immediately after removal of the cast.

Diathermy

Therapeutic Action. Heat effect: active arterial hyperemia, which increases both the local and general body metabolism. The resorption of inflammatory exudates is promoted in both acute and chronic traumatic and inflammatory conditions of extremities as well as of internal organs, such as arthritis, bursitis, bronchitis, pneumonia, chronic cholecystitis, pelvic inflammations, sinusitis, etc.

Local relief of pain is explained by the much deeper action on all nerve endings as compared to the more superficial action of other means of heat application. This analgesic action adds to the favorable influence of hyperemia in many acute inflammations. Many forms of neuritis, neuralgia, myalgia, and arthralgia respond.

Antispasmodic Action. Specific in contrast to the irritating action of the other electric modalities. Attacks of angina pectoris, as well as spastic conditions of the stomach, intestines and gall bladder, have been relieved.

Bactericidal Action. The deep heat of diathermy diminishes the vitality of the germs and increases the power of tissues to resist.

Monoterminal and Surgical Forms. If the current from the "Oudin" terminal is concentrated on a fine steel needle held in an insulated handle it will destroy benign blemishes and neoplasms of the skin.

Electrocoagulation offers a valuable method in treatment of larger neoplasms and malignancies in accessible locations.

Diathermy is contra-indicated in (1) acute inflammatory processes accompanied by fever; in (2) the presence of non-draining suppuration; in (3) tendency to hemorrhage; in (4) suspected malignancies (except when surgically applied).

The Advantage of Combining Methods of Treatment in Physical Therapy. Frank B. Granger, M. D., Boston, *Radiology*, March, 1928. Page 252.

This author says:

"Anterior Poliomyelitis—* * * While the nerve impulses are blocked such electrotherapeutic measures should be selected as will tend to minimize the muscular atrophy. * * * Ordinarily diathermy (internal baking) will, by causing an active hyperemia, flush the musculature and lessen the fibrillary contractions. Sinusoidal stimulation will give local muscle exercise, and massage will do its share in promoting the lymphatic circulation and maintaining the muscle tone. * * * Careful muscle-training for re-education should be instituted as the best means of securing functional restoration.

"Subdeltoid Bursitis—* * * Diathermy, followed by galvanism, massage and gentle manipulation, suffices in the majority of cases. * * *

"Fractures—* * * In many cases only radiant heat, massage, and active assistive motion are necessary. * * * If there is delayed union or non-union, properly applied diathermy, at times supplemented by general ultraviolet irradiation, will frequently stimulate callous formation. * * *

"Adenitis—* * * The treatment depends on the pathology. * * * If it is tuberculous in character, for the specific action of ultraviolet. * * *

"If a discharging sinus ensues, the local application of the water-cooled ultraviolet with a quartz sinus applicator, or local irradiation with the air-cooled ultraviolet. * * * The hard glandular type generally yields to X-Ray treatment, followed by general ultraviolet irradiation. * * *

"Spinal Sclerosis—* * * Diathermatizing the spine, with the production of an active hyperemia, apparently may cause nerve

regeneration. If careful massage and muscle-training are added to this, the results may be still more brilliant.

"Flat Foot—* * * The treatment may be subdivided as follows:

"1. Mechanical for temporary relief: * * * strapping to correct undue pronation, possibly shoes with Thomas heels and soles, and, at times, an inner sole with a felt pocket as a pad.

"2. For relief of pain in the acute stage: Use some form of heat, such as hot soaks, whirlpool bath, or diathermy, followed by massage or vibration.

"3. For restoration of muscle tone: This treatment should consist of exercises.* * * However, very few patients will carry out the proper exercise twice a day, and therefore it generally is necessary to add to the voluntary muscle exercise some electrical aids, such as the slow sinusoidal, which may be preceded by diathermy.

"Hemiplegia—* * * The sinusoidal hand-and-foot water bath is supposed to supply physiological cell stimuli which will minimize the changes in the musculature due to disuse. Massage and re-educational exercises will, in later stages, increase co-ordination to a marked degree.* * *

"Low Back Strain—* * * As muscle spasm is a predominant factor, for treatment use diathermy, which may relieve the spasm; follow this by adequate fixation, and as soon as possible add voluntary muscle exercise. * * *

"Malignancies—The physician, the surgeon, the roentgenologist, and the physiotherapist are all necessary.

Physical Therapy—Postive and Negative. J. C. Elsom, M. D., University of Wisconsin, Madison, Wis., *The Medical Herald and Physiotherapist*, Vol. XLVI, No. 8. August, 1928. Pages 222-3-4.

"The personal experience of the writer may here be given, in brief outline, of what he considers positive (or plus) physical therapy:

"1. Indications for thermotherapy—(conductive, convective and conversive heat)—Acute, inflammatory, painful conditions: Illustrations: sprains, contusions, fractures, myositis, neuritis, acute or traumatic arthritis, muscle spasm, upper respiratory infections, orchitis, epididymitis; (diathermy) synovitis and bursitis; (diathermy and radiant heat) erysipelas and herpes zoster; (radiant heat and ultraviolet) as a preliminary form of treatment preceding massage and manipulation. In infantile and other forms of paralysis, to maintain circulation and nutrition; and in sluggish ulcers and infected areas generally.

"Surgical diathermy is a positive form of physical therapy undoubtedly. No form of treatment seems so efficacious in accessible neoplasms, whether benign or malignant.

Physio-Therapy or Treatment by Physical Agents. By G. E. Richards, Associate in Radiology, Univ. of Toronto, *Univ. of Toronto Med. Bull.*, Vol. VIII, No. 4, June. 1928. Pages 3 to 14.

Electricity

"Of the various forms of electricity in use at the present time that which is known as diathermy is probably the most popular.

"The facts are that it is not new and that it is merely another way of applying heat. It has the great advantage, however, that the heat is easily controlled and can be produced within the tissues almost at any chosen point.

"1. Gonorrhoeal Epididymitis. The results of treatment by diathermy are quite as spectacular as the treatment of rickets by ultra-violet rays and occur much more promptly.

"The same is true but in a more restricted sense of gonorrhoeal arthritis in the acute and sub-acute stages.

"2. High Blood Pressure. We came to the conclusion that any reduction of pressure which occurred was due to peripheral dilatation, and although the actual reduction might be considerable it did not last more than a few hours, twelve being about the maximum. Apart from the peripheral dilatation we doubt if there is any other effect in this respect and therefore, the method is no better than any one of several other methods available for blood pressure reduction.

"3. Pneumonia. The only conclusion we felt justified in drawing from this work was that diathermy did not materially affect the death rate of lobar pneumonia in the type of case met within the Public Wards of a General Hospital.

"A few felt benefit from the treatment in the sense of added comfort, relief of dyspnoea, etc., but in others we concluded that this was more than offset by the inconvenience and consequent fatigue of arranging the electrodes and giving the rather prolonged treatment.

"4. Neuritis. We have not been able to verify the claims made for diathermy in the treatment of neuritis.

"I venture the opinion that the cases treated in which relief has been claimed in neuritis have not been true cases of neuritis, but have been some form of bursitis or more likely myositis.

"The latter group, together with sprains, muscle lacerations and recent fractures, form a group in which some of the best results may be obtained which are possible by any form of therapy.

"5. The Arthritides. In all forms in which benefit was obtained it was chiefly in relief of pain and swelling.

Surgical Diathermy

"In skilled hands it is a great boon to certain surgical procedures, but, like every instrument of its kind, its real usefulness depends entirely upon the skill with which it is employed.

Treatment of Anterior Poliomyelitis. H. J. Wyckoff, M. D., Seattle, Wash. *Northwest Medicine*, Vol. XXVII, No. 6, June, 1928. Pages 274-275.

"During the first stage the treatment is preventive, that is, to prevent muscle fatigue and prevent contractures. These can best be accomplished by placing the paralyzed extremities in some sort of support * * *.

"Contractures are caused by a loss of muscle balance, following a paralysis of a group of muscles. These are always preventable * * *. During this stage the child should, as a rule, be kept in bed and no active treatment attempted. Diathermy and other forms of heat may be used, and give definite relief in some cases.

Roentgenotherapy and Diathermy in Poliomyelitis. *Journal de Radiologie et d'Electrologie*, Paris 12:161-208 (April), 1928, F. F. Luzes. Page 172. Abstract from Journal American Medical Association, Vol. 97, No. 4, July, 1928. Page 283.

"Luzes reports the results obtained in forty-four cases of poliomyelitis with two series of roentgen-ray treatments, separated by an interval of thirty days, during which diathermy was used. Immediately following the diathermy treatments galvanization and faradization were employed, as well as massage and mechanotherapy. The roentgen-ray treatments consisted in irradiation of the spinal cord at the level of the segment corresponding to the extremity or extremities involved as soon as possible so as to profit from the destructive power of radiotherapy on newly-formed connective tissue cells which, proliferating about the involved motor cells, surround and destroy them by a process of neurophagia. It is especially in this period of invasion that radiotherapy is of value. Diathermy stops the vascular spasm and thereby counteracts the hypothermia and increases the nutrition of the tissues, particularly the muscles. In the forty-four cases treated, there were 13.6 per cent of failures, 38.6 per cent of ameliorations and 47.8 per cent of recoveries. It was noted that the degree of amelioration was inversely proportional to the time elapsing before the treatment was begun."

Quartz Light and Diathermy, Their Practical Use. A. L. Gleason. M. D., Great Falls, Mont., *Northwest Medicine*, September, 1927. Page 457.

The author states that some of his conclusions in the use of diathermy in the commoner diseased conditions are: "In the acute infections, such as pneumonia, influenza and tonsillitis we have been unable to demonstrate any peculiar advantage which diathermy has over other methods of treatment, although in some cases the sedative action of heat is very soothing to the patient.

"In gonorrheal infections we have found some cases, about forty per cent, that responded very nicely, principally in the male adult. The other cases showed no benefit whatsoever. In the gonorrheal vaginitis of little girls we have had five failures to one success.

"In the chronic and subacute arthritides the results have been very much better, especially for quick relief of the discomfort.

We do not use or feel that it is safe to use it in acute arthritis because of the contraindications as will be given later. In some cases of neuralgia and arthralgia the results have been fair, but the salicylates will usually give as quick and also more permanent relief.

"In acute neuritis, herpes, acute spastic torticollis and in recurrent pleurisy, the results have been very satisfactory. I would also mention the fact that many cases of chronic constipation from atony will respond nicely, and if it is possible to maintain the treatments over a sufficient period of time, together with regulation of diet, habit, etc., the end-results will be good. We use the diathermy only where heat is definitely indicated, and it is used simply as an adjuvant, not as the sole method of treatment.

"In surgical diathermy, often times called electrocoagulation, various degrees of heat are generated according to the laws above given and at the discretion of the operator. It is used principally in vascular conditions, such as nevi, warts, polyps, carbuncles, hemorrhoids. The method is of considerable importance where loss of blood is a prime consideration. The advantage over the Pacquelin cautery is that with the diathermy machine the heat is generated in the tissue itself and not radiated from a red hot instrument.

"There are two great contraindications to the use of diathermy: (1) the possibility of dangerous toxic materials being absorbed into the blood when treating infections, which we feel is an absolute contraindication to its use in any condition where pus may be present. (2) The possibility of starting hemorrhage, due to severe arterial hyperemia. * * *

SURGERY

Electrosurgery as Aid to Removal of Brain Tumors. By H. Cushing in *Surg., Gyn. and Obst.*, 47:751 (December), 1928. Abst. in Jour. A. M. A., Vol. 92, No. 2, January 12, 1929. Page 181.

Cushing reports on his experiences in removing brain tumors with the aid of Bovie's electrified wire loop. He says that the results have exceeded all expectation, and the methods of brain tumor extirpation have been largely revolutionized by these new principles. Five hundred and forty-seven operations for tumor have been performed. Though for some of these operations the electrical methods were not essential, there were few even when no tumor was found, in which they could not advantageously be employed. The currents are useful even for such trifles as brushing the surface of the dura with the ball electrode in order to seal the torn meningeal veins, from which persistent oozing points on the under surface of the reflected bone before its replacement, or for coagulating some refractory vessel on the incised dural margin.

The Treatment of Tumors of the Bladder by Means of Surgical Diathermy. Abraham G. Fleischman, M. D., Des Moines, *The Journal of the Iowa State Medical Society*, January, 1928. Page 1.

This author says in conclusion that "I firmly believe the surgical diathermy as outlined in this communication is by all means the method par excellence for the treatment of neoplastic diseases of the bladder; and, in my opinion, is immeasurably superior to any other method in vogue at the present time. I would advise the members of the profession who are interested in the therapy of this important malady to acquaint themselves with the method of surgical diathermy in order that they may use it intelligently and thereby secure a maximum amount of benefit to the patient."

The Treatment of Bladder Tumors. By Wilbur H. Haines, M. D., Philadelphia, in *Pennsylvania M. J.*, xxxii :6:405: March, 1929.

The author makes the following enumerations in his Conclusions:

1. A definite and satisfactory plan of therapy can be attained only by a simple uniform classification of tumors and the submission of each type to one line of therapy, with careful checking of results.

2. The trained and experienced cystoscopist, well informed as to clinical benignity and malignancy, is the proper person to determine the therapeutic measures desirable.

3. Endovesical fulguration, preceded by X-ray therapy, is the best treatment for papillomata and early papillary carcinoma without evidence of infiltration, uncomplicated by an intractible cystitis. When in doubt, this form of therapy is worth a trial.

4. When definite evidence of infiltration exists, when the tumor is favorably situated and does not involve ureteral transplantation, and when the subject is a good operative risk, resection preceded by X-ray therapy is recommended. While ureteral transplantation and total extirpation have been performed successfully, it is rarely justifiable.

5. In inoperable tumors, X-ray therapy, followed by intensive diathermy by cystotomy, is a conscientious effort to prolong life.

Electrosurgical Circumcision. By W. W. Walker, M. D., Baltimore, in *Amer. J. Surg.*, 7:1:103-104: July, 1929.

The instruments necessary in this operation are: four-pronged special dilator; electrosurgical apparatus; skin needle; Ochsner's clamp.

In my series of 90 cases, I found this method of circumcision to have several advantages over the older cutting methods, namely: simple technique; sealing blood vessels and lymphatics; heals first intention; little postoperative discomfort.

The prepuce is dilated until it forms a tight band around the dilator which is pulled forward beyond the end of the organ. The cutting current is applied just proximal to the tip of the prongs of the dilator. A complete circle is made with the cutting current, separating the skin only which retracts. A second circle is made with the cutting current severing the mucous membrane at the border of the retracted skin. Bleeding points, if any, are clamped and touched with the needle causing coagulation of the vessels and a cessation of bleeding.

The Electric Knife. From Paris Correspondent to *Jour. A. M. A.*, 92:14:1199: April 6, 1929.

The use in surgery of the electric knife, by reason of the fact that it accomplishes at the same time, electro-coagulation, is winning more and more advocates. It suppresses all hemorrhage during the operation, except from the large arteries. In reality, this invention is of French origin, having been used by Doyen as much as 20 years ago. But he employed currents of high frequency and high voltage. The new instruments utilize a much lower voltage, thus reducing the faradic effects to a minimum. Some instruments still produce shocks that are disturbing to the operator, but in the newer instruments this has been overcome to a great extent. Several members have recommended the advantages of the method before the Societe de chirurgie. M. Heitz-Boyer performed a nephrolithotomy entirely with the electric knife, without finding it necessary to place any catgut sutures; he placed merely a few catgut sutures next to the drains. M. Gernez performed likewise an amputation of the tongue, applying only a supporting ligature to the lingual artery. M. Proust removed a breast, but a phlebitis of the axillary vein ensued. M. de Fourmestraux has removed during the past four years, numerous epitheliomas of the face. He has treated likewise cancers of the cervix uteri before performing hysterectomy, eliminating in this manner the causes of the original vaginal infection.

Radiation and Electrotherapy in Superficial Lesions. Frederick W. O'Brien, M. D., *The New England Journal of Medicine*, May 10, 1928. Page 621.

This author says that "electrothermic methods are peculiarly adapted to the treatment of localized malignant growths occurring in any part of the oral cavity. * * *

"I have mentioned this high frequency knife here because of inquiry received from a consultant in regard to its use in the removal of tattoo marks. * * *

"Great care must be taken when using these electrical currents in the presence of an explosive anesthetic. I have recently seen two patients burned when dessication and electrocoagulation were attempted in the mouth while the patient was receiving respiratory ether. Rectal or local anesthesia only should be employed. * * *

Proper Technique in Electro-Surgical Methods. Grant E. Ward. M. D., Baltimore, Md., *The Industrial Doctor*, September, 1927. Page 342.

This author especially emphasizes surgical asepsis and says "the proper asepsis has two valuable assets. First, healthy granulations develop quickly, permitting early plastic operations before scar tissue causes contraction and deformity. It is important to remember that early plastic operations lessen hospitalization. Second, asepsis, as in any surgical wound, brings less danger to the patient. If the slough which is a fertile medium for bacteria, is allowed to become infected a strong reaction is immediately set up in the surrounding normal tissues."

Electrosurgery. By E. N. Kime, M. D., Indianapolis, in *J. Indiana State M. A.*, Vol. XXI, No. 11, November 15, 1928. Page 483.

"If superficial destruction is all that is necessary, or desired, such as in premalignant neoplasms of all kinds and in most any location, e. g., verrucae, nevi, lupus vulgaris, lupus erythematosis, tuberculous sinuses, furuncle, rodent ulcer, leukoplakia and superficial infections of the skin, chancroidal ulcers, cervical erosions, urethral caruncle and a host of other lesions which occasionally are resistant to the usual medicinal and surgical regimen, electrodessication is often brilliantly applicable. This is especally true in regions where for some reason scar tissue is to be avoided at all costs.

"If on the other hand, the lesion is more fungating, of more hyperplastic type, and where scar tissue is of secondary importance, electrocoagulation with or without excision is preferable. Unless excision is feasible, my practice is first to coagulate thoroughly around and beneath the lesion, then curette away all necrotic material and then coagulate again one or more times until satisfied that all the diseased tissue has been removed. This practice is more radical than that often advised, and sometimes necessitates ligation of large vessels, and the severance of ducts or nerves, but in the presence of cancer such a course is obligatory

"If the malignancy is destroyed and removed, the wounds usually heal with surprisingly little scar. If skin grafting is necessary they usually 'take' well.

"In stimulation of wound healing, in combating infection and keloid, the water-cooled quartz light has been very valuable. It is even possible to excise electrothermically a small keloid and prevent its reformation by the use of pressure radiation of the granulations through a quartz prism. Electrocoagulation is the agency of choice in accessible malignancy, large condylomata, and carbuncle. I have used it in cancer of the nose, ear, eyelid, vulva, cervix, breast, lip, cheek and extremities. Results in a series of one hundred cases, followed one to three years, were as follows: two deaths in cases already having general metastases and nine recurrences, five of which have been subsequently reoperated with apparent success. The method is, however, too new to base any positive conclusions, other than the obvious advantage of using some technic which will both destroy in situ and excise in toto."

Surgical Indications for Electrothermic Methods. William L. Clark, M. D., Philadelphia, *Archives of Physical Therapy, X-ray Radium*, September, 1927. Page 442.

This author believes that "Electrothermic Methods possess advantages in benign lesions as well as in the malignant lesions". This author uses it to remove ordinary moles, warts and tatoo marks and mentions that it cannot be used in Keloids.

He says that "Angiomas of the congenital type, which are not too extensive, are ideally treated by the Electrothermic Method. * * *

"Telangiectasis following X-ray treatment can be markedly improved at times with the desiccating current. * * *

"In early cases of cancer of the skin which are more or less superficial, the desiccating current should be used, followed by curettage, and a re-application to the base. It does not make any difference how large the lesion may be, if the current is applied thoroughly and carefully, we should be able to clear up practically all those cases. The technique for large tumors is the same: after thorough destruction, the lesion is curetted, and a re-application of the current made to the base. These growths seldom metastasize to the glands, and if properly done should heal without evidence of malignant disease, and remain well permanently. The scar is soft and flexible, and there is no contracture. * * *

"Epithelioma of the eyelids is quite a common condition. * * * The Electrothermic Method is a great advantage in the treatment of these conditions. * * *

"Epithelioma of the lower lip lends itself very readily to treatment by the Electrothermic method. * * * "

Prevention and Treatment of Postoperative Complications in Abdominal Surgery. G. W. Crile, M. D., and C. C. Higgins, M. D., Cleveland, *Journal Am. Med. Assn.*, November 19, 1927. Page 1738.

"In diathermy we have an ideal method for introducing heat into the body. As an emergency measure in the case of a patient whose energies are flagging, diathermy almost equals blood transfusion as a measure for temporary relief. Later we shall discuss diathermy as an important sustaining measure during certain abdominal operations."

Use of Diathermy in Surgical Treatment. By G. E. Ward, in *Arch. Physical Therapy*, Vol. 9, October, 1928. Page 433.

Abst. in Jour. A. M. A., Vol. 91, No. 22, December 1, 1928. Page 1747.

"Ward has been greatly impressed with the value of diathermy for surgical use. He has used electrothermic methods in most of the various kinds of abdominal operations, such as cholecystectomies and gastro-enterostomies. There is a definite advantage in the reduced bleeding in these operations. Diathermy is especially useful in opening the viscera preparatory to the making of an anastomosis, or in resecting metastatic lymph glands in the abdomen and pelvis and nodules in the intestinal wall. It is valuable in the treatment of hemorrhoids. It is a rapid method of destroying the lining of epithelial cysts, saving long, difficult and dangerous operations. It is possible to destroy metastases in the intestinal wall and invert them with excellent healing."

Electrotherapy for Postoperative Gall-Bladder Adhesions. By L. H. Levy, in *Physical Therapeutics*, 47:329: June, 1929.

Abstract in Jour. A. M. A., 93:4:333: July 27, 1929.

Levy uses infra-red radiation and diathermy. The abdomen, especially over the site of the incision, is exposed for one-half hour to the infra-red rays as warm as the patient can stand them. For the diathermy two plates, at least 5x7 inches, are placed front and back, the one in front as high up as the gall bladder region and low enough to cover the entire incision. In this way the entire area which has been exposed in the operation will be covered. Not more than 1,000 milliamperes in the obese, or 1,500 milliamperes in the thin, should be used. Better results are obtained with frequent treatments using less milliamperage than with less frequent treatments employing greater milliamperage. Because of this Levy advises daily treatments, and when this is not possible at least three treatments weekly. Enough cases have been treated by this method to give it a place in the treatment of periduodenitis. Duodenal irritation seems to be relieved and, when temporary obstruction due to spasm has existed, this tends to disappear, resulting in marked lessening if not entire disappearance of symptoms. This method is worthy of consideration and should be used prior to operative procedure, especially in cases in which the symptoms and the condition of the patient are not serious enough to warrant immediate surgical intervention.

Diathermy as a Means of Prevention and Treatment of Surgical Shock and of Post-operative Pneumonia. By U. V. Portmann, M. D., Cleveland Clinic, Cleveland, Ohio, in *Brit. J. Actinotherapy*, 4:2:33: May, 1929.

In most cases we prefer to direct the heating effect of diathermy through the liver, the base of the lungs and the heart. For application during operations our usual method is to employ well-lathered metal electrodes about 4x6 inches in size although the size varies with the shape and size of the patient. The electrodes are placed on the lateral chest walls below the axillae, directly opposite each other, so that the heated zone includes the base of the thorax and the liver area. The electrodes are held in place by large dry rubber sponges under a snug cloth binder. They are soldered to the cord terminals so that they may not accidentally become detached or cause sparking. I

should perhaps state that only nitrous oxide anesthesia is used in our hospital. When ether or any other explosive anesthesia is employed, every precaution should be taken to prevent sparking and the diathermy apparatus should be kept at a distance from the operating table by the use of long cords, while the apparatus should, if possible, have the enclosed type of spark-gaps or tubes. Preferably the treatment is begun before anesthesia is induced, so that the patient may indicate when a comfortable degree of warmth is attained, but if the patient is unconscious we use from 800 to 2400 milliamperes of current, depending upon the size of the electrodes. Usually from 20-30 minutes is required to increase the temperature.

Present Day Status of Physical Methods in Surgical Diseases. Gustavus M. Blech, M. D., *Archives of Physical Therapy, X-Ray, Radium*, Vol. IX, No. 7, July, 1928. Page 289. (Read at the sixth annual meeting of the American College of Physical Therapy, Chicago, Nov. 3, 1927.)

He speaks of treating a number of "patients with epithelioma of the forehead, face and lower jaw. In all clean resections were performed by electrocoagulation with and without the use of the cutting current. The results have been invariably good in accord with the experience of Wyeth, Clark and others, and it seems that surgical diathermy has its greatest triumphs in the accessible, malignant neoplasms. * * *

"The electro-dissection method has been used by us in one case of scirrhus of the mamma. The operation proved conclusively that the current seals the smaller vessels, for we had to use only a relatively small number of hemostats. But when it came to dissecting the axillary glands we resorted to the scalpel, because here we felt the dissection should proceed under direct control of the eye. * * *

"V-shaped excision of the tongue for carcinoma was made by us on a young man two months ago. * * * He refused partial amputation of the tongue. We sutured the wound with silk and had the satisfaction of seeing healing by primary intention. He is being treated with the x-rays as a precautionary measure. * * *

"In gynecology electrocoagulation is the method of choice for the removal of urethral caruncles. * * *

"We have had excellent results in the treatment of fissures of the rectum. * * *

"Theoretically, as well as practically, hemorrhoids of all sorts can be treated successfully by electrocoagulation under infiltration analgesia. The results are far superior to those attained by the old clamp and cautery method, for the heat does not radiate to distant structures as is the case with the red hot iron or the galvanocautery. We make one exception and that is in thrombotic hemorrhoids, when opening of the growth and expression of the clots is the logical procedure. * * * *"

Selected Surgical Procedures with Surgical Diathermy. By Grant Eben Ward, M. D., Baltimore, Md., in *Arch. Physical Therapy*, Vol. IX, No. 10, October, 1928. Page 434.

Under Hemorrhoids the author says:

"Here we find one of the most strikingly useful fields. The advantages of this method over the usual type of hemorrhoidectomy are:

"1. A practically bloodless and therefore rapid and simple operation.

"2. The post-operative course is smooth, there being as a rule little pain, and practically no swelling.

"3. In many cases it is an office procedure.

"Anesthetic.—One or two percent novocain solution is injected subcutaneously around the anus and then deeply under the sphincters on all sides, as high as the hemorrhoids extend.

"Technic.—After thorough dilation of the sphincter allowing adequate exposure, the hemorrhoid is grasped with any suitable clamp. This causes stasis of the contained blood, making coagulation possible, which is accomplished by inserting a needle electrode held in suitable handle and carrying a strong monopolar desiccating current into the vessel, allowing it to remain until the blood has coagulated and the intima has been destroyed. The clamp may then be removed without disturbing the contents of the vein. I prefer to open and remove the clot, allowing free drainage for any possible infection.

"I use a modification of this technic preferring the smoother, quicker active bipolar coagulating current. After coagulating the hemorrhoid beyond the clamp the active electrode is applied directly to the hemostat, the current flowing down it to the tissues held within its grasp. These tissues are then fused by the current. One must not allow deep penetration into the lateral structures giving a large post-operative slough."

The Credentials of Electrothermic Methods in Surgery with Special Reference to the Treatment of Neoplastic Diseases. Wm. L. Clark, M. D., *The Industrial Doctor*, August, 1927. Page 321.

"Experience has taught that operative surgery, electrothermic methods, radium and X-rays are all factors of such importance that none of them can be eliminated. All of these methods are employed in the author's hospital, either alone or in combination to meet particular indications, and it has been learned that to eliminate any one of them, we would be seriously handicapped. The author, therefore, holds no brief for any particular method, but experience has demonstrated to him the extreme importance of electrothermic methods, which, through misunderstanding of them, have not yet taken their rightful place in surgery. The author considers electrothermic methods as second to none, and indeed in many emergencies superior to all others. It is emphasized in this article that electrothermic methods can best be practiced only by those who have had surgical training and experience. They are quite as surgical in practical application as operative surgery, requiring the same precise knowledge of anatomical landmarks and the same surgical judgment that every good operator must have. The probable reasons for the apathy that exists in regard to these methods are, that surgeons do not realize their potency, and those who use them without surgical accomplishments frequently fail in their practical application.

"The electrothermic methods should be used alone only in localized tumors of the type that do not tend to metastasize. The basal cell type of epithelioma occurring on cutaneous surfaces, such as the face, eyelids, etc., even though extensive, and with involvement of bone, may be so thoroughly treated by the desiccation or coagulation method that recurrences are infrequent. This conclusion has been reached from the careful observation of the results of such treatment in over three thousand cases of this type."

Diathermy in Joint Injuries. F. W. Ewerhardt, M. D., St. Louis, *Journal Am. Med. Assn.*, October 10, 1925. Page 1111.

During the last 10 years more than 70,000 treatments were given under the author's direction in the Physiotherapy Department of the Washington University, School of Medicine.

Among his conclusions are:

"(1) It is a valuable measure to at least partial control of pain, spasm and swelling in earlier stages of fractures and joint injuries, and contributes, therefore, materially to a favorable functional end-result.

"(2) Unquestionably, the period of convalescence in the treatment of fractures is materially reduced.

"(3) Its application seems indicated in post-operative bone and joint conditions, acute sprains, fractures and bursitis; when brasiere is found necessary, in acute and chronic arthritis and in treating contractures and fibrositis."

Diathermy in Painful Shoulder Conditions. Richard Kovacs, M. D., *The Medical Herald and Physiotherapist*, July, 1927. Page 181.

Kovacs emphasizes that "the first step in taking charge of any painful shoulder conditions is the establishing of a proper anatomical diagnosis and of the etiology of the lesion. The following types of shoulder lesions were diagnosed and treated: fractures, dislocations, sprains, acute arthritis or synovitis, subacute and chronic arthritis of monarticular or polyarticular type of infectious and traumatic origin, muscular strains or traumatic myositis, tenosynovitis, sprains of tendon insertions, bursitis, brachial neuritis, and a peculiar type of false neuritis, described by Lovett as 'irritable arm.'" The author applies diathermy to shoulder by four methods, giving appropriate illustrations of each.

Treatment of Fractures of the Shaft of the Femur. By E. M. Townsend, M. D., Norfolk, Va., in *Va. Med. Mo.*, Vol. 55, No. 8, November, 1928. Page 538.

This author says in part: "We have found the introduction of venous blood at the site of the fracture and walking with

support valuable in hastening callous formation. Sunshine and ultraviolet rays are likewise valuable. Diathermy is very helpful in alleviating pain, and to stimulate callus."

Some Plans in the Treatments of Injury to Joints. Harry E. Mock, M. D., Chicago, *International Journal of Medicine and Surgery*, September, 1927. Page 350.

"Diathermy may be indicated. It is one of the best means of relieving the pain in a joint, and this form of application of heat commenced early will give the best results in a synovitis, bursitis and similar conditions so frequently accompanying joint injuries."

Fractures About the Elbow Joint. Philip H. Kreuscher, M. D., Chicago, *Illinois Medical Journal*, January, 1928. Page 41.

"Hydrotherapy and physiotherapy, more especially diathermy, are indicated after the tenth to the twelfth day. These measures I consider our greatest aids in the restoration of function."

The Management of Tarsal and Metatarsal Fractures. John D. Ellis, M. D. and John S. Coulter, M. D. *The Journal of the American Medical Association*, Vol. 91, No. 2, July 14, 1928. Page 81.

"There is a certain amount of muscle laceration with hematoma formation within the muscles. The ratio of absorption of this hematoma is inverse to the amount of cicatricial tissue formation in the muscle. This absorption is hastened by two measures; heat and massage. Before the application of massage the injured member is exposed to heat rays from a radiant heat lamp or an infra-red generator or to electrically generated heat-diathermy."

Fractures of the Femur. W. L. Estes, M. D., Bethlehem, Pa. Read at the meeting of the American Radiological Society, New Orleans; reprinted from *International Journal of Medicine and Surgery* in The Industrial Doctor, Vol. 6, No. 6, June, 1928. Page 116.

"We have found besides assisted movements and massage, diathermy to be very useful. Diathermy also seems to be of great service in cases of delayed union, combined with heliotherapy, fresh air, calcium salts internally and massage. This physiotherapy should be given by a trained individual; it should be gradual and graduated and always under the direction of the surgeon."

Diathermy in External New Growths Outside the Mucous Cavities. Richard Vallack. M B., Ch. M. (Sidney), *The American Journal of Physical Therapy*, January, 1928. Page 459.

This author says that "in deciding the method of operation upon any external neoplasm, the main desiderata are:

(i.) Certainty of eradication.
(ii.) Minimal destruction of adjacent healthy tissue.
(iii.) Minimal resultant scarring.
(iv.) Minimal hæmorrhage.
(v.) Minimal post-operative pain.
(vi.) Speed in operating.
(vii.) Minimal resultant shock.

"In diathermy properly applied we have, I believe, a method that fulfills these aims in a manner more sure and certain than does any other technique at our disposal.

"Let us consider these seven points seriatim:

"(i.) The destruction is carried out with the growth in situ, so that in case of malignant disease we escape all risk of reimplantation.

"(ii.) As the malignant cell is destroyed (in vivo at least) by lower temperatures than is the body cell, we know that for a definite zone beyond the actual line of destruction the tissue cells are unharmed, while they are nevertheless sterilized in regard to stray nests of infiltrating malignant cells. If we bear to compare with those obtained by means of electrothermic this in mind, it can be seen how some small but appreciable amount of healthy tissue can be conserved.

"(iii.) The lessening of deformity is further secured by the fact that the scar resultant after electrocoagulation—by correct diathermy technique—is soft, pliable and not contracted.

"(iv.) Primary haemorrhage is entirely abolished, as all vessels and their blood content are coagulated with the growth.

"(v.) Post-operative pain is greatly diminished by destruction of all nerve endings.

"(vi.) A great saving of time is effected during the operation, as there are no vessels to be picked up and no stitches to be inserted.

"(vii.) Absence of shock is the natural corrollary to the last three factors."

Observations on the Effects of Diathermy in Osteomyelitis. Disraeli Kobak, M. D., Chicago, Illinois, *Archives of Physical Therapy, X-Ray Radium*, September, 1927. Page 431.

This author believes that "in selected cases of chronic osteoperiostitis and chronic traumatic osteomyelitis furnished clinical recoveries in advance of similar control cases treated by Dakinization and hot compresses. Diathermy must be applied in subintensive doses; in short twenty-minute treatments; preferable every twenty-four hours; by the through and through method; not by the double cuff method."

Electrocoagulation in Recto-Anal Region. By H. Bordier in *Paris Medical*, 1:365: April 20, 1929.

Abstract in Jour. A. M. A., 92:26:2196-7. June 29, 1929.

Bordier extols the good results of the electro-coagulation treatment in various diseases of the anus and rectum. The treatment was carried out under local anesthesia in the anal region and without anesthesia in the rectum. The patients were not confined to bed, and the local post-operative care consisted only in irrigations with a weak antiseptic solution, applications of antiseptic ointment and the administration of mild cathartics to keep the stools soft. In the anal fissures the pain disappeared immediately after the electrocoagulation of the fissure (with a needle applied for a few seconds), and the scars were eliminated in eight days, on the average. In hemorrhoids, insulated needles were used for the massive electrocoagulation of all the hemorrhoids at one treatment, or, preferably, the electrocoagulation (monopolar or bipolar) of the hemorrhoids was done in several stages. Rectal prolapses were cured after from four to five treatments by electrocoagulation with noninsulated needles. The electrocoagulation was used often successfully in the treatment of the benign tumors of the rectum and even of the sigmoid, and in blind perianal fistulas. Thus, in a case reported by the author, a chronic blind perianal fistula in a woman was cured by three electrocoagulation treatments.

Diathermic Treatment of Inflammatory Stricture of the Rectum. *Journal Am. Med. Assn.*, December 11, 1926. Page 2011.

"Dr. Bensaude, chief physician of the St. Antoine Hospital in Paris, who has made many researches on the rectum and who is the inventor of a widely used rectoscope, has published an article on diathermic treatment of inflammatory stricture of the rectum. His results are better than those obtained by the ordinary methods. The passing of large sounds has to be continued indefinitely. Surgical treatment cannot be relied on either. During the two years that Dr. Bensaude has employed his procedure at the St. Antoine Hospital, the results were as follows: Twenty-seven patients were affected with inflammatory stricture of the rectum, five presented vegetative rectitis or anitis with infiltration of the walls. Of the first group of twenty-seven patients, ten have at present no trace of stricture. One recovered thirteen months ago, another nine months ago; three others have been well for six months, the others for only two or three months. The other seventeen have been under treatment for shorter periods. They are improved but not completely cured. Of the five patients presenting anorectitis with infiltration of the walls, two were cured completely of the induration. In the three other patients who are still under treatment, the induration has diminished considerably."

Salpingitis—Diagnosis and Treatment. By W. Roscoe Jepson, Sioux City, Iowa, in *Jour. Iowa M. S.*, 19:4:185-187: April, 1929.

This author says that "when the stage of chronicity arrives, and this is in a large percentage of cases, one must resort to palliative measures or surgical interference. Many patients get along fairly well with their spells of rest and their douches.

Diathermy has been demonstrated as being very helpful in this stage. If, however, tender masses such as pyo- or hydro-salpinges exist, these patients are semi-invalids and their only certain relief is through operation.

Carpal Osteitis. By Harry Clyde Blair, Portland, Oregon in *Annals Surgery*, 89:5:748-751: May. 1929.

Treatment has consisted of the application of heat by means of diathermy and of immobilization. In some cases treated over an extended period of time we have seen filling in of the bone cavities and the disappearance of symptoms. We have not found it necessary to remove the bones in any case.

This disease is apparently a distinct clinical entity. It is comparatively common and is often overlooked. The X-ray findings of cavity formation are positive proof of its existence, the X-ray being quite distinctive.

Trauma is not the only etiologic factor. Two cases here reported, one with febrile reactions and the other in a child, do not come under this etiologic classification. The term carpal osteitis seems a fitting term to include both the traumatic and non-traumatic types.

Observations on the Use of Diathermia for the Prevention and Treatment of Surgical Shock. By U. V. Portmann, M. D., Cleveland Clinic, Cleveland, Ohio, *Arch. Physical Therapy*, Vol. IX, September, 1928. Pages 386-7.

"It is evident that the body is actually heated by diathermia; and that the lungs are heated when the current is passed through them, but that the heat is dissipated by the pulmonary circulation and not by the respiratory air exchange, which is desirable for the heating of a patient and confirms our clinical experience.

"It is a well known fact that when the temperature is lowered, chemical and metabolic processes are diminished. It is also well known that one of the most valuable methods of treating or preventing shock is the application of heat.

"Because of experimental and clinical observations we concluded that it would be possible to improve the status of our patients by the prevention of undue cooling of the abdominal viscera at operation or after operation. This we were able to accomplish by applying diathermia through the liver, the base of the lungs and the heart during and after hazardous operations. In abdominal cases, in bad risk cases in particular, we have demonstrated repeatedly by thermometer readings that by this means the temperature of the liver is either raised or at least is kept at a normal level during and after operative procedure, which is not true in untreated cases.

"In applying the diathermia we use well-lathered metal electrodes which are usually about four by six inches in area. An electrode is placed on each lateral chest wall below the axilla so that they are directly opposite to each other and the heated zone includes the liver area. The electrodes are held in place by large dry rubber sponges under a snug cloth binder. Preferably the treatment is begun before anesthesia is induced so that the patient can indicate when a comfortable degree of warmth is attained, but if the patient is unconscious, from 800 to 2,400 milliamperes of current are used, the amperage depending upon the size of the electrode in use. The electrodes are soldered to the cord terminals so that they cannot become detached, thus preventing the possibility of sparking between the electrode and patient.

"For two years we have used diathermia in many cases either for the treatment or the prevention of shock, or during the convalescence of debilitated patients, and have seen no ill effects from the procedure. We are convinced, however, that the status of patients thus treated is definitely improved both during and after operation and the application of diathermia is now a routine procedure on our surgical service."

TUBERCULOSIS

Physiotherapy in Renal Tuebrculosis. By W. F. Martin in *Bul. Battle Creek San. & Hosp. Clinic*, 24:2:103-109: April, 1929; J. Urology 12:5:293.

The author mentions the use of heliotherapy, diathermy and hydrotherapy in the treatment of this condition, and says in part:

Diathermy is a form of thermo-therapy which can be accurately localized, hence its recognized value in the treatment of kidney

cases. By the proper adjustment of electrodes the temperature can be raised, producing a localized fever which retards the propagation of bacteria and lowers their resistance to body defenses. Experimental work has been performed to establish well this specific local action; and abundant clinical evidence exists as to its great therapeutic value. We have found it a great aid for relief of pain in the treatment of renal tuberculosis. It increases the specific gravity of the urine, thus lessening the frequency and burning of urination. The technique we use is a 6-inch electrode placed posteriorly over the kidney, with an 8-inch one anteriorly. Beginning with 500 milliamperes, we gradually increase to 1000 milliamperes for from ten to thirty minutes at a time. A similar application focused on the bladder is effective in relieving vesical pains, and reducing the frequency. While we do not consider diathermy a specific in these cases, we are convinced of its value in the relief of distress which frequently is so exhausting and debilitating that it prevents the patient from accumulating sufficient energy to develop immunity against the infection.

GENITO-URINARY DISEASES

Regeneration of the Bladder Following Resection. Herman L. Kretschmer, M. D., and K. E. Barber, M. D., Chicago, *Journal Am. Med. Assn.*, February 4, 1928. Page 355.

Abstract of Discussion

Dr. George A. Wyeth, New York: Dr. William J. Mayo has pointed out that only particles of molecule size, such as sugar, the amino acids and other crystalloids, are absorbed directly into the blood capillaries of the body, while the colloids and particles of larger size are taken up by the lymphatics. He says that bacteria and malignant cells do not pass directly into the capillaries but are carried by phagocytes into the lymphatics, which are a closed system of vessels. To emphasize this point is to emphasize the danger of dissemination that lies in the severance of these lymphatics when using the scalpel, and the advantage which inheres in a method that seals these lymphatics, instead of opening them. This is best performed by the endotherm knife or cutting current. Since its perfection we have discontinued the use of the scalpel in the treatment of malignant conditions. We believe that endothermy will do all that the scalpel will do and with more lasting benefit. The mistake most genito-urinary men are making with electrothermic methods is in not using them until other methods have failed, and then, as a last resort, produce too widespread, needless destruction by uncontrolled dosage, the effect of which is often disastrous and is always caused by the use of the blunt electrode. A large area of coagulation necrosis naturally results with its consequent toxemia, for which the doctor has just prescribed but which should never have happened. It is always the result of faulty technic. Drs. Cunningham, Graves and Bovie have worked out a method of measurig by thermocouples the amount of heat induced in the tissues (not in the applicator) at the time of applying diathermy. This is important. Repeated attempts to fulgurate a benign tumor are all wrong. This is not endothermy. If we expect to destroy a tumor we should go after the growth there and then and destroy it and remove it. I have learned that underdosage with these currents is just as bad as underdosage with radium, and we shall not get results unless we use the current properly.

Dr. B. C. Corbus, Chicago: * * * Recently, we have come into the possession of a diathermy cystoscope, which utilizes the shaft of the cystoscope as the active electrode. We have found this method to be far superior to any electrode that we could use through the ordinary operating cystoscope.

Dr. D. N. Eisendrath, Chicago: * * * In Chicago we are using diathermy in carcinoma of the bladder much more frequently than radium and are much pleased with the results. We are waiting until five years have passed before we say much about it, but from the immediate results in a large series of cases, we are pleased and hopeful. I thing that Dr. Wyeth is making a mistake in saying that we are trying to use a desiccating current.

Dr. Bransford Lewis, St. Louis: * * * In reference to diathermy and radium, there is a place for both these methods. If a large tumor is recognized as carcinoma, one should not use

radium alone in that case. I would expect to remove the gross portion of the tumor by means of the cautery knife, then use diathermy and get all the effect I could; then, after a month or so, perhaps, make an implantation of radium seeds, dependent on the progress of the case.

Dr. B. A. Thomas, Philadelphia: Papillary carcinomas are of two types: (a) those exhibiting carcinomatous degeneration of their papillary surface, but possessed of a benign pedicle, and (b) those with a carcinomatous pedicle involving the bladder wall. The former respond to treatment admirably and are curable even by cystoscopic fulguration; the latter must be classed with infiltrating carcinomas in general. They should never be treated by fulguration, if the growth can be excised radically, and obviously, the results, comparatively, are poor. * * * In two or three cases, the patient's death was undoubtedly hastened, I believe, by the implantation of radium needles, which precipitated metastasis to the lymphatics and bones. For the last three years, we have not supplemented diathermy by any implantation of radium, and I am positively convinced that our results have been better than when we employed massive doses of radium by needle implantation, supplementing thorough destruction of the tumor mass by fulguration.

The Treatment of Tumors of the Urinary Bladder. H. Wade. *Edinburgh M. J.*, 1927 xxxiv, Med.-Chir. Soc. Edinburgh, 1.

Abts. Surg., Gyn. and Obst. (July, 1927).

The author discusses the nature of bladder tumors in general, emphasizes the tendency of such neoplasms to cause early sudden haemorrhage, and reviews in some detail the various methods of treatment. * * *

The treatment of tumors of the bladder is determined by the nature, size, spread, and dissemination of the growth. For the benign villous papilloma the best treatment is fulguration. A number of such treatments at intervals of two weeks may be necessary to destroy the tumor completely. If a tumor of this type is too large for fulguration, a suprapubic cystotomy with removal of the neoplasm must be done. In this operation great care must be taken to prevent the implantation of tumor cells in the region of the bladder wound. For a year after the operation the author subjects his patients to frequent cystoscopic examinations in order that he may be able to fulgurate any daughter tumors that may appear.

Malignant papillomatous borderline tumors should not be fulgurated; the best results are obtained with radium.

In cases of primary carcinoma of the bladder the treatment to be given depends upon the situation and extent of the growth. In many cases partial cystectomy may be done successfully. In advanced cases, the pain may be relieved by total cystectomy.

Results Obtained by Various Methods of Treatment in 622 Cases of Bladder Tumors. Scott and McKay, *New York State Journal of Medicine*, Sept 1, 1927. Page 949.

"The essential factor in the treatment of bladder tumors is their proper classification as to the type of growth. * * *

"The tumor having been properly classified, it is not, as a rule, difficult to select the most appropriate form of therapy.

"Benign papillomas always respond to fulguration alone, but these tumors often disappear much more rapidly when cystoscopic applications of radium are used in addition to fulguration. These tumors recur, and often it is necessary to have the patients return from time to time for cystoscopic examination over a period of several years after the primary growth has been destroyed.

"Malignant papillomas very frequently respond to fulguration alone, but much more satisfactory results are obtained if the tumor is first thoroughly treated by cystoscopic applications of radium and then fulgurated. These tumors recur more frequently than the benign type and this necessitates the patient's return for cystoscopic examination at intervals of every few months.

"Papillary carcinomas, if not too extensive, usually respond to radiation plus fulguration, and should first be subjected to this combined therapy. In a few cases where this therapy has failed the tumor has responded to X-ray. Should the methods mentioned above fail, the tumor should be resected if it is a favorable location for such a procedure. If its location is unfavorable, it should be cauterized superficially and implanted with radium or treated with deep diathermy. * * *

"The value of diathermy as a therapeutic measure in the treatment of infiltrating carcinomas of the bladder has not as yet been definitely established."

Results in the Treatment of Cancer of the Bladder. Vincent J. O'Conor, M. D., Chicago, *Illinois Medical Journal*, November, 1927. Page 369.

This author says in conclusion that "fifty patients with carcinoma of the urinary bladder have been carefully studied and followed clinically over a period of eight years.

"While the number of patients is not large, the series is rather typical of all groups of these cases. Only one method of treatment was used in the management of these patients. Thorough, slow, deep electro-coagulation commonly known as *diathermy*.

"There were four immediate operative deaths—a mortality of 8 per cent.

"Twenty patients are living and well without evidence of recurrence after periods varying from one to eight years. An ultimate clinical success, at least for the time being, in forty percent of the patients.

"We believe that diathermy offers a more satisfactory means of combating malignancy of the bladder than any other therapeutic procedure, not only for relieving the patient symptomatically and prolonging his life, but with a definitely measured hope of complete cure in a large percentage of cases."

Bladder Tumors: Removal with Fulgurations. Otto J. Wilhelmi, M. D., St. Louis, *Missouri Medical Association Journal*, May, 1928. Page 199.

This author says that "the following advantages of fulguration over suprapubic surgery may be cited: (1) Easy application of fulguration; (2) no confinement to bed after treatment, and rapid recovery; (3) very small possibility of bladder or kidney infections after treatment; (4) local urethral anesthesia; (5) that 95 per cent of benign papillomata and 65 per cent of papillary carcinomata can be destroyed by fulguration; (6) the possibility of recurrence in other parts of the bladder is diminished."

Physical Agents in Treatment of Bladder Tumors. E. Beer, New York, *American Journal of Surgery*, New York, February, 1928.

Abst. J. Am. Med. Assn. (April 14, 1928). Page 1248.

Beer reviews his experience in the treatment of more than 400 bladder tumors with physical agents, such as: (1) various modalities of the high frequency currents through the cystoscope; (2) use of these currents through the opened bladder combined with alcohol to prevent implantations; (3) resections of the bladder with the radio-knife actuated by a very rapidly oscillating (1,200,000) high frequency current; (4) use of radium seeds (emanations)—(a) through the cystoscope; (b) through the open bladder, and (5) deep roentgenotherapy. It is evident that the results accruing from the use of these agents are steadily getting better, thus warranting their use.

Bladder Tumors. J. C. Negley, M. D., Los Angeles, *California and Western Medicine*, March, 1928. Page 145.

This author says that the "methods of treatment in this series of cases at least seem to favor fulguration or surgical diathermy, either through a closed or open bladder. All of those having cystoscopic fulguration, to say the least, had less discomfort and loss of time than those having x-ray or treatment through the open bladder.

"My observation has been that a large size and apparent malignancy should not deter one from using fulguration through cystoscope, for many of those here recorded had reached generous size. Surgical diathermy through the open bladder causes the patient comparatively little discomfort and pain. There seems to be only slight tendency to fibrosis, thus making the dreaded hydronephrosis a less frequent complication."

Diathermic Treatment of Medical Kidney Diseases. Gustav Kolischer, M. D., Chicago, Illinois, *Archives of Physical Therapy, X-ray Radium*, August, 1927. Page 391.

This author says that "medical diathermy if properly applied in the correct way is one of the most powerful methods at our

command in order to re-establish a proper elimination not only of the kidneys but of the intermediate structures which are just as important. It is very important to make a differential diagnosis for two reasons: one is where and how to apply the diathermy, and the second is how to support the diathermy by all other proper measures that have to be taken in order to provide the possibilities of a successful therapy."

The Diagnosis and Treatment of Bladder Tumors. B. C. Corbus, M. D., Chicago, *Illinois Medical Journal*, November, 1927. Page 365.

This author says that from his experiences he has formulated the following classification as a guide to treatment; and he gives in this article the technic for a treatment with some very good illustrations:

1. Benign papillomata (apparently so on cystoscopic examination). If there are but few papillomata and they are easily accessible, trans-urethral thermo-electrocoagulation (diathermy) should be employed, using the bipolar method and the diathermy operating cystoscope.

2. Multiple benign papillomata and tumors inaccessible transurethrally. (Suprapubic cystotomy, followed by thermo-electrocoagulation (diathermy), with the bipolar current, is the method of choice.

3. Carcinomata. These tumors are treated by the same method as multiple papillomata, excepting that the diathermy coagulation is carried out more slowly and a wider area of apparently normal tissue is included in the destruction.

4. Tumors involving the ureteral ostium. As the ureter passes in a diagonal course through the bladder wall it is possible to "burn it back", destroying the tumor and at the same time preserving the function of the ureter. As a consequence, tumors situated near the ureteral ostii are destroyed in precisely the same manner as tumors in other parts of the bladder.

Treatment of Tumors of the Bladder by Surgical Diathermy. By A. G. Fleischman, M. D., Des Moines, in *Arch. Physical Therapy*, Vol. 9, No. 12, December, 1928. Page 528.

"In conclusion, I firmly believe that surgical diathermy is by all means the method par excellence for the treatment of neoplastic diseases of the bladder; and, in my opinion, is immeasurably superior to any other method in vogue at the present time. I would advise the members of the profession who are interested in the therapy of this important malady to acquaint themselves with this method in order that they may use it intelligently and thereby secure a maximum amount of benefit to the patient."

Surgical Diathermy in Treatment of Malignant Tumors of Bladder. By W. E. Stevens, in *Calif. and West. Medicine*, 30:29, January, 1929.

Abst. in *Jour. A. M. A.*, 92:8:683, February 23, 1929.

Seven patients with carcinomas—four papillary and three infiltrating in type—were treated by Stevens with surgical diathermy through the open bladder. Four are alive and free from recurrence—one three years and three months, one two years and one month, and one six months after operation. One patient died six days after operation. Stevens is convinced that surgical diathermy is of greater value than any other procedure and that it is destined to become the most popular method of treatment of malignant tumors of the bladder.

Treatment of Vesical Ureterocele. H. Martius. *Zentralblatt für Gynäkologie, Leipzig*, February 5, 1927.

Abst. J. Am. M. Assn. (July 2, 1927).

For very small fistulas, not surrounded by hard scar tissue, Ottow recommends touching the margins of the fistula with a diathermy sound, introduced into the bladder. The procedure is almost painless. An in dwelling catheter should then be inserted and left in position for ten days, to put the bladder at rest and allow the edges of the wound to come together. He had complete success with this method with a fistula of one year's standing, caused through late necrosis in the region of a suturated and healed wound in the bladder wall, inflicted in the course of cesarean section.

A Review of Urologic Surgery. Albert J. Scholl, M. D., Los Angeles, E. Starr Judd, M. D., Rochester, Minn.; Linwood D. Keyser, M. D., Roanoke, Va.; Gordon S. Foulds, M. D., Toronto; Jean Verbrugge, M. D., Antwerp, Belgium; and Adolph A. Kutzman, M. D., Los Angeles, in *Arch. Surg.*, Vol. 17, No. 6, December, 1928. Page 1051.

Tumors—Beer (Traitement des tumeurs de la vessie, par les agents physiques, J. d'urol. 24:327, 1927), at the Third Congress of the Society of International Urologists, stated that the employment of high frequency currents through the cystoscope has given excellent results in the treatment of tumors of the bladder. There are known differences in the action of the unipolar and bipolar current. The unipolar is more explosive and of a higher tension and requires greater amperage. The action of the bipolar current is more useful in producing extensive coagulation of the pedicle of a tumor. * * *

Beer has had excellent results in the endoscopic treatment of vesical tumors in 158 cases. In about 20 per cent of the cases, there were recurrences. * * *

He suggested bringing the bladder outside the peritoneal cavity for a good exposure. The bladder should be opened with a radio knife and the various tumors coagulated and removed. Results with this treatment were satisfactory in thirty-three cases; 85 per cent of the patients were apparently cured.

Treatment of Malignant Tumors of the Bladder, with Special Reference to Surgical Diathermy. By William E. Stevens, M. D., San Francisco, in *California and West. Med.*, Vol. XXX, No. 1, January, 1929. Pages 29, 30, 31, 32.

Read before the Urology Section of the California Medical Association at the 57th annual session, April 30 to May 3, 1928.

Results with Various Methods of Treatment

Surgery—As will be seen from the statistics the primary mortality, as well as that occurring during the first year following resection, is very high.

Radium—One of the most objectionable features of radium therapy is the bladder spasm due to radium burn.

X-Ray—Objectionable features of x-ray therapy are burns and frequent local and systemic reactions.

Percy Cautery—In Negley's series, 17 patients were treated with the Percy cautery. Sixteen were dead.

Untreated Cases—O'Conor reviewed 50 cases of carcinoma of the bladder treated exclusively with surgical diathermy. Twenty were symptomatically well with negative cystoscopic findings for a period of from one to seven years. Twenty-six patients were uncured. Kolischer, however, is even more optimistic than Corbus and O'Conor. He finds that the primary mortality is only 5 to 10 per cent, while about 75 per cent of the patients treated with surgical diathermy remain well.

Advantages of Surgical Diathermy

Surgical diathermy unlike surgery sterilizes the field. It does not open blood vessels or lymphatics, consequently, there is no danger of disseminating tumor cells and thereby producing distant metastases. There is seldom any bleeding; therefore no time is lost ligating blood vessels. There is very little surgical shock. The heat is developed in the tissue and the degree of heat can be regulated; the depth of penetration is more accurately determined and the tissues may be coagulated to any depth. Its effect is immediate. The active electrode is cold when applied and it does not burn or char. Cunningham, Graves and Bovie have devised a method of measuring the degree of heat induced in the tissues by means of thermocouples. Surgical diathermy is more accurate than radium.

Even if the patient's general condition warrants total cystectomy or even partial resection the operative mortality is much higher and the probability of secondary infection of the kidney much greater than that which follows surgical diathermy, especially if it is necessary to transplant one or both ureters. The discomfort suffered by the patient after total cystectomy is often worse than death. With surgical diathermy it is often possible to remove tumors in cases unsuitable for more radical operative procedures. If not cured, patients at least live longer and are more comfortable. The pain and hemorrhage are always relieved.

Diathermy: Its Use in Gonococcal Infections of the Female. By Winfield Scott Pugh, B. S., M. D., New York City, in *J. New Jersey M. Soc.*, xxvi:3:223-4-5: March, 1929.

In diathermy we have a modality of applying high heat of a known degree. It will destroy the gonococcus in the tissues without injury to the patient. Diathermy is a bloodless procedure and produces no shock. In the last year or so adverse comment has arisen regarding its use, particularly on the part of gynecologists. On investigating these complaints we generally find that the equipment has been inadequate. This finding has also been noted by Walther and Peacock. It is of the utmost importance that we have a heavy duty machine.

Technic—Place a block tin electrode 4x6 in. (with its under surface well soaped) over the suprapubic area.

The Corbus thermophore is now introduced into the urethra when possible. * * * A current of 600 to 800 milliamperes was employed until the thermometer registered 43 degrees to 47 degrees C. for twenty to thirty minutes. * * *

Upon completion of the urethral treatment, the themophore is withdrawn from the urethra, a small vaginal speculum introduced, and the cervix brought into view. * * * Where the cervix will tolerate an instrument, either the Corbus or the Peacock electrode may be used. The latter has the advantage that it is made in several sizes, the merit of which is obvious. * * * The current is turned on very gradually, that is about 100 milliamperes every thirty seconds until we reach the point of tolerance. This is often as high as 1000 milliamperes on the dial. In degrees Fahrenheit it will reach about 114 to 117 or 46 to 47 degrees C. At about this point the heat can be stabilized for forty minutes. * *

In his summary this author says:

In diathermy we have an ideal method for the treatment of gonorrheal infections of the urethral and cervical canal with its complications.

All treatment is conducted by the physician so that he is in contact at all times. It must, however, never be intrusted to a so-called technician.

Provided one is willing to keep within bounds, it is painless and the procedure not complicated.

It protects the patient, as she does not have to keep medicines or douche bags about her room.

Our observations, and those of others, show at least 70 per cent of cures, which is certainly excellent.

This report is based on 500 cases, not only in our own, but from several of the largest services in the United States.

Treatment of Pelvic Inflammations by Diathermy. By C. A. Robinson, M. B., London, England, in *Am. J. Physical Therapy*, 5:12:539-40-41: March, 1929.

A diathermy current passed between electrodes, placed back and front, may or may not be good, but the pelvic contents are not heated by this means.

If, during a treatment so administered, a thermometer is placed in the cervical canal, no rise of temperature will be recorded. * * *

Generally six to eight bi-weekly treatments are sufficient.

The technique now used is as follows: An electrode is introduced into the urethra and by means of diathermy currents the tissues immediately surrounding the electrode are heated to a temperature which is believed to be 115° F. This temperature is estimated by the patient's own sensation and is the point where the sensation of heat changes to pain.

The insensitive cervix is then treated in a similar manner, the current used to produce the temperature in the sensitive urethra being taken as the standard for producing the same temperature in the insensitive cervix.

It was found that in cases of gonococcal arthritis in women it was necessary to treat the cervix only.

In treating for gonococcal infection and for arthritis, I had noticed that pain in the lower abdomen had sometimes occurred during treatment by diathermy. This occurred in cases in which other signs of salpingitis were absent.

It was determined in future to use a milder degree of heating in such cases hoping that a subsidence of the salpingitis might thus be produced.

Technique and Results of 250 Diathermy Treatments of Acute Gonorrhea. Ross Edgar Hunt, M. D., Belvidere, Ill., *Illinois Medical Journal*, October, 1927. Page 313.

This author says, in conclusion, that of some two hundred and fifty diathermy treatments given it is found that the average case treated with diathermy and showing an initial profuse purulent discharge will not be profuse at the end of four or five treatments given every other day, that all but the morning drop will have disappeared in about a month and that the morning drop two weeks later will be absent. Further, monthly posterior soundings have been consistently negative.

Treatment of Acute Epididymitis. Meredith F. Campbell, M. D., New York, *The Journal of the Am. Med. Assn.*, December 17, 1927. Page 2108.

This author says that "observations were made in a series in which diathermy was used. We were convinced that pain may often be rapidly relieved by this method, but could not discern any advantage over the simple adhesive suspensory. In some instances, certain favorable psychic reactions accompany the use of electrical apparatus, but these per se do not alter the course of the disease. * * *"

Dr. B. C. Corbus, Chicago: "I am not surprised that Dr. Campbell did not get better results with the use of the ice bag. Dr. Pelouse has shown that the gonococcus cannot be destroyed at 108 deg. F., but that it can be destroyed at 113 deg. F. Dr. Campbell says that in twenty-four hours the fever and pain were alleviated, and the case went on to a successful termination. This drop in temperature and lessening of pain is due, I believe, to the fever in the first twenty-four hours which destroys the gonococcus. * * * We can attack the gonococcus when it is localized more readily with heat than with any other methods that we have. Our practice is to apply diathermy so that the epididymis is held firmly fixed between two electrodes, continuing the treatment for one hour. We have been surprised at the excellent results that we have obtained. We have had actors go back on the stage and do tumbling acts without any interference following such treatment. We never put a patient to bed. We have had cases in which the diathermy did not do any good, and in those instances the patients were treated surgically. In all such cases we have found a mixed infection present. Our practice is to use the diathermy, and then apply a good tight-fitting suspensory; in all our cases of gonorrheal epididymitis, we have had good results."

Diathermy in Gonorrhea. M. Sorrentino, *Riforma Medica*, Naples, February 6, 1928.

Abst. J. Am. Med. Assn. (May 12, 1928). Page 1594.

In nine cases of chronic gonorrheal urethritis, prostatitis or spermatocystitis, the usual treatments had failed. Following a series of treatments with rectal and urethral diathermy, the patients recovered. The number of treatments varies from fourteen to forty.

Diathermy in the Treatment of the Uro-Genital Organs. C. A. Robinson, M. R. C. S., L. R. C. P., London, Eng., *The American Journal of Physical Therapy*. Vol. 5, No. 4, July, 1928. Page 183.

"Rapid subsidence of inflammation of the tubes and ovaries takes place and usually after four or five treatments given during ten to fourteen days, the treatment of the cervix is proceeded with.

"As far as I know, no case of gonococcal salpingitis will fail to subside under this treatment. The pus tubes disappear to the ordinary methods of examination and all the symptoms are relieved. * * *

"In 1919 also began the attempt to rid men of gonococcal infection. As a result of this work the following may be claimed.

"1. Cases of gonorrheal urethritis treated from the first by the method used will subside in six weeks to two months * * * but will not result in the same abortive effect on the infection as in the case of women. * * *

"2. The effects on the metastases resulting from infection of the prostate and vesicles such as arthritis and epididymitis are most marked and rapidly obtained."

Modern Treatment of Gonorrhea. H. W. E. Walther, M. D., New Orleans, *New Orleans M. & S. J.*, Vol. 81, No. 3, September, 1928 Page 199-204.

"Paraurethritis. * * * These glands are easily destroyed by one application of high frequency spark.

"Periurethritis. * * * If the abscess points urethrally, it can best be opened through an endoscope with high frequency spark.

"Cowperitis. * * * Diathermy to the perineum has materially helped me clear up these foci which are so inaccessible.

"Seminal Vesiculitis. * * * Besides massage diathermy is used in the obstinate types of both vesiculitis and prostatitis. No perfect electrode has yet been devised for this work but the V-shaped instrument that is placed via the rectum against the prostate with the other blade resting on the perineum is superior to others.

"Epididymitis. * * * Diathermy has materially reduced the number of epididymi that go on the abscess formation.

"Arthritis. * * * We depend upon rest and diathermy chiefly to promptly arrest the process. After all is said and done results will follow only if the primary focus of infection is recognized and efficiently treated. * * *

"Bartholinitis. * * * The application of diathermy by means of the needle electrode inserted into the duct and gland sterilizes both in a few seconds. * * *

"Skenitis. * * * Again the diathermy needle, employed through a urethral speculum or better through an electrically illuminated skeneoscope, is the most valuable agent we have to sterilize these foci. * * *

"Endocervicitis. So much has been written within the past few years on diathermy and its value in endocervicitis that we need say little here. It is the one and only sure way to destroy gonococcal infections of the cervix and at the same time in no way injure tissue. Sufficiently intense heat will kill gonococci: that we know. With electrothermic high frequency we can obtain the needed degree of heat, within the tissues, for periods sufficiently long to destroy the bacteria."

Surgical Diathermy in Prostatic Hypertrophy. *Lancet*, London, 1:741-742 (April, 1914), 1928.

Abstract in The Journal of the American Medical Association. Vol. 90, No. 23, June 9, 1928. Page 1910.

"Remijnse has found surgical diathermy in the treatment of prostatic hypertrophy of the utmost value. The advantages of this method are: 1. The treatment is not very dangerous. 2. It can be executed without pain after a preliminary injection of procaine hydrochloride in the urethra. 3. There is no bleeding. 4. The procedure is under the continuous control of the forefinger. 5. All kinds of prostate trouble which involves retention can be treated, even the atrophic prostate. 6. This method can replace a considerable number of otherwise unavoidable prostatectomies. 7. In cases in which operation cannot be carried out on account of the bad general condition, diathermocoagulation can still be applied successfully."

Prostatitis. *Journal American Medical Association*, October 10, 1925. Page 1155.

Replying to a query by a correspondent, the *Journal* states, "Diathermy furnishes excellent results in cases of chronic prostatitis."

Diathermy for Prostatitis. *Letter to the Editor of Jour. A. M. A.*, 92:25:2124-5: June 22, 1929.

To the Editor—1. What is the value of diathermy in treating chronic prostatitis and seminal vesiculitis of ten years duration? 2. At what intervals and for what periods of time should the treatments be administered? 3. Should the treatments temporarily aggravate a coexisting auricular fibrillation? 4. What type of apparatus and what type of rectal electrode are best suited for the treatment of these conditions? Please omit name,

M.D., Philadelphia.

Answer.—1. Medical diathermy, the heating within physiological limits of tissues by means of high frequency currents, is a valuable aid in treating chronic prostatitis and vesiculitis. 2. The sequence of the treatments is mainly determined by the tolerance of the rectum, which, however, rises in the course of application. As a rule, treatments administered every other day are well borne. It is important to evacuate the bladder and rectum previous to the diathermic application. The rectum is best cleansed by an oil enema. At first the treatment is continued until the patient reports spasmodic contractions within the lower pelvis. After a better tolerance is once established the minimum duration of each sitting should be 30 minutes, which period later on is extended to one hour. Each treatment is started with a minimum of current, the magnitude of which is gradually increased until the patient reports a pronounced sensation of warmth within the rectum. The report of feeling distinct heat calls for reduction of the current to the level indicated.

3. Moderate treatments have no undesirable effects on the cardiac action.

4. Any standardized prostatic electrode and diathermy apparatus will answer the purpose.

Prostatitis—Treatment by Diathermy. By Owsley Grant, Louisville, Ky., in *Archives Physical Therapy*, 10:9:408: Sept., 1929.

Only two points have come to our attention to contraindicate diathermy. One is the possibility of burn, or injury to rectal tissue. We have never seen incidence of this though we are always extremely careful in manipulating these cases. We use no rectal thermometer, believing that the patient's sensation is sufficient guide and alarm. The other point is, does diathermic heat in the prostate increase the likelihood of epididymitis? We have thought that it did in subacute prostatitis though only the ordinary clinical observation substantiates us.

Our chief contribution is the realization that patients with hidden foci of infection may show only very slight or no signs of prostatic involvement in the urine or prostatic secretion, yet with their aching joints and neuralgia is a sense of fulness in the perineum and inguinal discomfort. These patients after treatment by diathermy express increasing amounts of pus from the prostate, the remote symptoms of infection are temporarily aggravated and then as the flow of pus increases the symptoms improve.

The ordinary forms of prostatitis are as well treated without diathermy as with it after the flow through the ducts has begun.

In acute cases diathermy is undoubtedly dangerous.

The Present Status of Chronic Infections of the Prostate Gland. By John B. Wear, M. D., Department of Urology, Univ. of Wis., Madison, in *Wisconsin M. J.*, 28:11:510-512: November, 1929.

The treatment should first seek to eradicate infected foci elsewhere in the body.

Massage of the prostate should not be given more often than three times a week. Diathermy and hot rectal irrigations are useful adjuncts at times.

Occasionally a gland will be found in which massage cannot be used, due to the pain. Other contraindications for massage are: (1) tuberculosis, (2) hypertension, (3) debilitating diseases, as malignancy, (4) immediately following instrumentation, (5) recent illness, and (6) acute general or local conditions elsewhere in the body.

The massage is usually followed by a posterior instillation of some mild antiseptic, as 5 per cent argyrol. After six to eight weeks of treatment, the patient is given a month's rest.

Diathermy in the Treatment of Gonococcal Disease of the Genito-Urinary Tract. By Victor D. Washburn, M. D., Wilmington, Del., in *The Hahnemannian Monthly*, lxiv:7:520: July, 1929.

I have found diathermy particularly useful in acute inflammation of the prostatic urethra and epididymis as well as in chronic prostatitis. The results in gonorrheal arthritis when the treatment has been applied directly to the original focus of infection has at times been especially gratifying.

I have on a few occasions, been able to treat successfully acute urethritis in the male. The technical difficulties are such and the results so irregular and uncertain that I no longer use it in this condition.

I have also found diathermy useful in hastening the liquefaction of a slowly developing abscess.

Diathermy is not useful in treatment of enlargement of the prostate. In selected cases where an enlarged prostate is congested and it seems wise to relieve an acute condition this may be used.

In the female I have found diathermy useful in the treatment of urethritis, endocervicitis and salpingitis.

Non-Surgical Diathermy in Urology—Technique and Case Reports. By William Bisher, M. D., New York, in *Urol. & Cutan. Rev.*, 33:10:669-670: Oct., 1929.

Chronic Prostatitis. Number of cases treated, 40. Duration of treatment, 2 months on the average. Symptomatic improvement, 40. Unimproved, 2. Improved, 10. Cured, 23. Criterion for cure was the absence of pus in the prostatic secretions on massage.

Acute gonorrheal epididymitis.—Technique: Corbus clamp in situ, 500-1,000 milliamperes for 30 minutes. Treatments every other day. All cases provided with a special non-adhesive scrotal support.

Diathermy is a specific for gonorrheal epididymitis.

Use of High Frequency Currents in Treatment of Prostatic Disturbances. By G. Arnold, in *Bull. et mem. de la Soc. des Chir.*, 21:89: (Feb. 1), 1929.

Abst. Jour. A. M. A., 92: 16: 1391: April 20, 1929.

Arnold reports a case of adenoma of the prostate in a man, aged 58, who had considerable pollakiuria, severe pains on urination, 75 cc. of residal urine, and fever and was in poor general condition. He was completely cured by two treatments of electrocoagulation applied to the prostate through the urethra. In all cases of urinary disturbances caused by small hard sclerous prostates or by medium sized or by partial (median part especially) hypertrophy of the prostate, the author uses high frequency currents for boring into the prostate through the urethra or transvesically, after a suprapubic cystotomy. In the cases of large prostates he performs prostatectomy.

The Relation of the Reticulo-Endothelial System to Genito-Urinary Work. By K. Kolischer, M. D., and A. E. Jones, M. D., in *Am. J. Surg.*, vii:3:351: March, 1929.

The most potent agents for raising the defensive power of the reticulo-endothelial system are medical diathermy and the administration of the aseptic protein shock. A timely application of these methods will necessarily improve the therapeutic results.

Gonorrheal Posterior Urethritis: Diathermy. By Wm. Bierman, M. D., New York, in *Physical Therapeutics*, 47:2:98: February, 1929.

I applied diathermy to the posterior urethra by means of a rectal electrode and a suprapubic electrode, changing to the belt electrode. It has been my experience in general that in the treatment of the prostate by means of diathermy the clinical results I obtain seem to be somewhat better where the belt electrode is used rather than the suprapubic electrode.

These treatments were applied twice a day. The treatments endured from one-half to one and a half hours each. I used sufficient current, as I do in general diathermy, to reach the point of comfortable heat tolerance. In this instance that amounted to about 1000 ma. as judged by the ordinary hot wire milliamperemeter. At the end of a week the symptoms of acute posterior urethritis disappeared and the second urine specimen became absolutely clear.

Treatment of Gonorrhea. By Col. L. W. Harrison, M. D., F. R. C. P., London, Eng., in *Amer. Jour. Surg.*, 7:3:369-370: Sept., 1929.

As regards treatment of complications we have found heat very useful in complications of gonorrhea, and particularly in prostatic complications. I use it in my own department, applying diathermy to the prostate and vesicles in cases of gonorrheal arthritis. We simply go to the focus of infection, and find it does very well. We have no use for diathermy applied to the urethra as a direct attack on the gonococcus. I do not believe that diathermy acts by destroying the gonococcus by heat, but possibly by promoting drainage from the vesicles, and possibly by autogenic vaccination. Our experience in the treatment of diathermy applied to gonorrhea in the female has not been favorable. We have taken cultures where diathermy has been tried over a long period. Personally I do not think diathermy does anything by destroying the gonococcus; but it is an exceedingly valuable method of treatment in such cases as gonorrheal arthritis depending on a particular focus. We also found that true of diathermy in the treatment of other complications.

Treatment of Gonorrheal Arthritis.

To the Editor,

Jour. A. M. A., 93:6:478: Aug. 10, 1929.

A patient of mine, a married woman, age 21, was suffering with acute gonorrheal arthritis of the right elbow. I treated her with mixed gonorrheal vaccine and fixation with plaster of paris. Local treatment to the existing endocervicitis is being carried on. The inflammation in the elbow is now entirely gone but there remains a fibrous ankylosis. The joint has been quiet now for six weeks. Would it be safe to break up the fibrous ankylosis under ether anesthesia? Is diathermy indicated in this case? How would intra-muscular injection of fibrolysin (solution thiosinamine sodium salicylate) affect the condition? The arm is ankylosed in a position of semiflexion or the position of greatest usefulness.

M.D., Pennsylvania.

Answer.—It would be safe and advisable, under ethylene, very gently to flex and extend the elbow once, and only once. When elbows are used as pump handles, injuries are caused to the joint structures which result in more numerous adhesions than existed previously.

Diathermy, baking, massage and gentle active and passive movements are indicated. These cases are resistive as a rule. It requires persistence on the part of the patient and the physician before a good result is accomplished.

Typhoid vaccine used intravenously as nonspecific protein is often more valuable than gonorrheal vaccine.

The Present Day Treatment of Acute Gonorrhea in the Male. Abr. L. Wolbarst, M. D., New York, *The American Journal of Surgery*, March, 1928. Page 280.

This author says that "diathermy aims to destroy the gonococcus by the application of heat to the invaded tissues, and by increasing the body resistance. In acute anterior urethritis, the results have not yet justified our earlier expectations. In certain cases it is useful as an adjuvant to the local use of silver salts. * * *

"Hydrotherapy is of great value in the form of hot sitz baths and hot rectal recurrent irrigations. * * *

"Certain cases are distinctly malignant in character almost from the outset; the inflammatory process instead of subsiding persists with increasing severity, in spite of any and all treatment, possibly because of it. The urine remains markedly purulent, often tinged with blood; the adnexa are intensely inflamed, large and tender; urinary distress reaches the maximum degree, even to the point of complete retention. It seems as though prostatic abscess or epididymitis must be the inevitable sequence, and very often this is exactly what happens. Foreign protein, vaccine and intravenous therapy often prove useful in these cases, but we have in vasotomy and diathermy two therapeutic agents which have demonstrated their great value in meeting this difficult situation. * * *

"Diathermy also is extremely useful in these cases, but its results are slower and less certain than those of vasotomy. Diathermy may be administered either with a prostatic electrode in the rectum, or with a pad electrode on the perineum, the indifferent electrode resting on the pubic region. The latter method is the more comfortable for the patient and probably more effective. * * *

"Acute Epididymitis—Strapping has passed into the discard where it belongs. Recently introduced methods of treatment have done much to diminish the pain and prostration and the degree of permanent damage to the organ. Diathermy is the most useful of these; it is practically a specific. * * *

"Acute Arthritis—There can be no effective treatment of the arthritis which does not include the eradication of the vesicular infection as the primary step. Everything else is secondary and merely palliative. * * * Diathermy applied to the prostate and seminal vesicles also is very effective. Cumberbatch and Corbus acting on the principle that the infected joint is a metastatic extension of the basic vesicular infection, apply diathermy to the adnexa, with excellent results as regards the arthritis."

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Gonorrheal Arthritis. B. A. Thomas, M. D., Philadelphia, *The Journal of the American Medical Association,* December 24, 1927. Page 2174.

This author among other things lists in his treatment diathermy and the various rays from violet to red quartz. In the discussion of this article, Dr. D. P. Willard says "in the later stages, after the inflammation is gone, physical therapy is by far the most important therapeutic agent."

Dr. Richard Kovacs of New York says "there can be no question that physical therapy, particularly diathermy, belongs among the most modern therapeutic methods in arthritis. At the Reconstruction Hospital in New York, we have had quite a number of cases of arthritis of gonorrheal origin, and our results with diathermy have been successful. The gonococcus is easily affected by heat, being thermolabile, and a temperature of from 108 to 115° F., or even less, will kill it. It is not necessary to open the joint to get the heat into it. Diathermy will convey any amount of heat desired into the joint safely and effectively, and it has proved most effective in the subacute and chronic stages. Applying to the site of focal infection, the seminal vesicles, the prostate, and, in women, to the cervix and the urethra, has been extensively done at Dr. Cumberbatch's clinic at St. Bartholomew's in London. He found that by simply treating the focal infection he secured excellent results, and others have corroborated these observations."

Diathermy in Urology. C. O. Ritch, Chicago, *Illinois Medical Journal, Oak Park,* November, 1927.

Abst. J. Am. Med. Assn. (December 24, 1927). Page 2223.

In Ritch's opinion, medical diathermy is of extreme importance to the urologist in the treatment of gonorrheal arthritis and acute epididymitis.

Gynecology. Howard A. Kelly, A. B., M. D., LL. D., and collaborators. Pub. by D. Appleton & Co., 1928. Chapter 48. Pages 974-994.

Under the title of "Electrothermy" Dr. Grant E. Ward says:

"High frequency electric currents are finding a definite place in medical and surgical gynecology, coordinate with a larger field in general surgery.

"Two principal types of active electrodes are in use—the needle, and the blunt (button, spherical and olivary) electrode. * * *

"The concentrated current sterilizes the adjacent tissues but contamination may come from handles and wires leading to the electrode unless carefully sterilized by boiling or soaking in carbolic acid and alcohol.

"Thoroughness of treatment. All of the disease must be destroyed with the least injury to normal tissue. * * *

"Dry surface. Continued hemorrhage indicates insufficient treatment. * * *

"Circumvallation. A zone of coagulation is first thrown around the growth, and if possible beneath it, cutting off the surrounding blood and lymph channels. * * *

"Histology. Desiccation (monopolar current) dehydrates and reduces the tissues to a dry whitish material, under the microscope. The bipolar current coagulates the cell proteins into a homogeneous mass, the connective-tissue stroma being converted into an eosin-staining hyaline material and the blood-vessels being filled with clotted blood, often with walls destroyed and included in the structureless mass.

DISEASES TREATED

"Gonorrhea—The gonococcus is instantly destroyed at a temperature of 113 degrees F. or at 104 degrees F. prolonged for six or eight hours.

"Urethritis—The thermophore is inserted into the urethra and held in place by a clamp. If no pain or tingling occurs at a temperature of 112-113 degrees F. (44.5-45 degrees C.) the application should be continued for thirty minutes. * * *

"Infection of Skene's and Bartholin's Glands—A fine needle used as the active electrode is inserted into the gland and a weak current turned on and continued until the surrounding tissues are whitened and dried.

"Endocervicitis—The inactive electrode is adjusted as in urethral treatments with the cervix well exposed and the metal end of the thermophore inserted into the canal up to the hard rubber sheath and held there. * * * 116-117 degrees * * * for thirty to forty minutes.

"Salpingitis—Medical diathermy is here used as an adjunct to the usual methods of treatment.

"Nonspecific infectious diseases—Chronic and Cystic Cervicitis—Can be treated by bipolar electrothermy, the active needle electrode being thrust into the cervix at various points until the diseased area is thoroughly coagulated.

"Infected Sinuses and Fistulas—

"Pruritus—The active pointed monopolar electrode is played over the surface until it presents a white desiccated appearance.

"Chancroid; Venereal Warts; Veruca Acuminata—Desiccating current.

"New Growths—Benign tumors yield quickly to desiccation or coagulation with a resultant soft pliable scar. * * *

"In destroying sarcoma or a carcinoma, one must use a heavy desiccation or coagulation current with the patient under general anesthesia or sacral block.

"In treating malignancy it is often well to combine radium with high frequency currents. * * *

"Cervix Uteri—Papilloma—The Vagina—Using a hard rubber speculum * * * with the active electrode carrying a coagulating current. * * *

"Carcinoma—Here radium is the chief curative agent. Sometimes, however, electrocoagulation is an excellent adjunct. * * *

"Urethra—Caruncle—Including prolapse of Mucosa and Granuloma—The first rare and the latter rather common maladies are best treated by the monopolar high frequency current applied either with a fine or a blunt electrode.

"Polyps—Polyps at the external meatus are removable by using a clamp as the active electrode.

"Carcinoma and Sarcoma—These are best handled by combining radium with the current.

"Bladder—Electrothermic methods in gynecology here find one of their most interesting and often brilliant fields.

"Ulcer—The results in the diathermy treatment of bladder ulcers are so gratifying and the technique so simple, that the current is quickly applied with little discomfort and no anesthesia. A monopolar (desiccating) current of fairly high amperage is applied by a long, well-insulated electrode inserted through an open-air cystoscope with the patient in the knee-chest posture.

"More study and observation of temperature readings are needed to clarify the situation.

"Coagulation of inoperable metastatic glands in situ offers one of the great opportunities in cancer surgery."

Clinical End Results Following Diathermy in Gynecologic Conditions. Mortimer N. Hyams, M. D., New York, *American Journal of Obstetrics and Gynecology,* February, 1928. Page 224.

The author in pointing out that there has been greater progress in surgical diathermy than in medical diathermy says that "many clinicians do not have the time, patience or inclination to apply the slower modality with the necessary persistence and attention to detail so that cures are sometimes reported on insufficient evidence. * * * On the other hand, some gynecologists can see no merit, present or future, in medical diathermy. Reckless statements emanating from either the over-enthusiast or the nihilist are a detriment to clinical progress. * * *

"Diathermy should not be regarded as a cure-all. If used properly in selected cases, particularly in combination with other therapeutic agents, it is certainly of great value."

He then proceeds to outline his handling of certain conditions:

"Urethral Caruncle—Diathermy is an ideal method of treatment for caruncles.

"Condyloneata—Eighteen such cases have been treated with perfect results.

"Acute Gonorrheal Urethritis—In uncomplicated cases, diathermy has produced results which justify the opinion that it is the method of choice in these cases.

"Skene's Gland Infections—Sixteen cases have been cured with diathermy.

"Bartholin's Gland Infections—Prefers surgical incision.

"Gonococcal Endocervicitis—His own experience has been 'so disappointing' that he has 'discontinued using it.'

"Dysmenorrhea—The results have varied considerably in these

with clean gauze. The fact that it is used as a thermophore guarantees a certain amount of heat, which has a sterilizing quality."

Medical Diathermy in Urology—Analysis of End Results During Seven Years. By Vincent J. O'Connor, M. D., Chicago, in *Illinois Med. J.*, 56:163-166: Sept., 1929.

Acute Anterior Urethritis—No satisfactory method for treating infections of the male urethra with diathermy.

Periurethritis—In none of these had suppuration taken place before diathermy was started. Urethral treatment was stopped and by means of through and through diathermy the infected area was subjected to one or two hours heat induction a day. Hot applications and hot soaks were advised in conjunction with the above. In over 50 per cent of these individuals the infected follicles soon became soft and established drainage through the urethral lumen.

Stricture of the male urethra—While diathermy is theoretically of great value in hastening the dilatation of the more dense scars, here again we have found but a scant use for this method.

Aberrant urethral glands harboring the gonococcus—These are easily destroyed by the fine wire active electrode introduced to their depths so that complete coagulation of the epithelial structures results.

Gonorrheal prostatitis, prostatic abscess and seminal vesiculitis—In the instance where drainage has become markedly interfered with and prostatic abscess is impending, we have found the application of rectal diathermy of greatest value. * * * Of 17 recorded instances of early prostatic abscess, or "impending" abscess, 13 subsided rapidly after rectal diathermy.

Epididymitis—In gonorrheal epididymitis we find the greatest and most consistently valuable use of medical diathermy.

Gonorrheal arthritis—Arthritis of gonorrheal origin is very markedly benefited by through and through diathermy of the inflamed joint.

Gonorrheal urethritis—In 91 instances of acute gonorrhea in the female where no evidence of paraurethral infection existed at the time, only three developed this complication later on.

Gonorrheal endocervicitis—215 women have been treated prior to May, 1927, by endocervical diathermy. 38 have had additional cauterization of cervical glands and follicles. Of this number, 85 have been checked for more than three years and 42 for more than two years. The remainder were not seen after the cessation of active treatment.

Infection of Skene's or Bartholin's glands—In the majority of instances drainage and later excision of the gland is most satisfactory.

Gonorrheal Salpingitis—In the acute stages of tubal infection with pelvic pain, elevation of temperature and leucocytosis, it is generally agreed that palliative treatment is advisable unless gross suppuration occurs. Through and through diathermy has been a very valuable additional palliative measure at this time.

Reflex Suppression of Urine: Diathermy Treatment. B. W. Blumenthal, *Munchen med. Wchnschr.*, 75:1457, August 24, 1928. Abst. J. A. M. A., Vol. 91, No. 17, October 27, 1928. Page 1326.

"A man with a slight stricture in the posterior urethra attempted the use of the bougie himself. Absolute suppression of urine followed, which lasted into the third day and brought the patient to a grave condition. After failure of the usual methods, Blumenthal tried diathermy treatment of both kidneys. The first application lasted ten minutes and was followed by prompt results, 500 cc. of urine being discharged spontaneously in the next two hours. The treatment was repeated in the afternoon of the same day. Urination commenced and continued during the entire night and to the middle of the next day. Thereafter it was normal and the uremic symptoms disappeared."

GYNECOLOGY AND OBSTETRICS

Electrodiathermy—Its Use in the Treatment of Benign and Malignant Lesions of the Uterine Cervix. Frank M. Mikels, M. D., Long Beach, *California and Western Medicine*, January, 1928. Page 67.

This author says in conclusion that "electrodiathermic treatment of lesions of the uterine cervix is more efficacious than topical medical applications.

"Electrothermic treatments of cervical lesions are more conservative than any of the surgical operations when it is feasible to apply these methods.

"Electrodiathermic treatment of lesions of the uterine cervix does not interfere in any way with successful plastic operations for the repair of extensive lacerations, but leaves a clearer and cleaner field for these procedures.

"Electrodiathermic methods of treating very persistent and obstinate neisserian infection of the uterine cervical mucosa have proven most efficacious.

"Electrodiathermic treatment of cervical erosions and the adjacent inflammatory tissue do not impair the sphincter action of the musculature of the uterine cervix nor interfere with its normal distensibility during parturition.

"Electrodiathermy should receive the careful consideration and respectful recognition of all obstetricians and gynecologists who are interested in conserving the function of this generative organ, and in preventing the occurrence of cancer of the cervix."

The Diseased Cervix. Elbert Dunlap, M. D., Dallas, *Texas State Journal of Medicine*, April, 1928. Page 790.

This author says that "as the changes are not constant a variety of treatments have been offered; chemical, surgical, radium, passive hyperemia, high frequency currents, cautery, electrocoagulation and diathermy. * * *

"Diathermy and electrocoagulation are seriously and enthusiastically advocated by many who feel that the results following such treatments are much more satisfactory than those following the use of the cautery. The high frequency currents have the advantage of being easily controlled. Absence of bleeding and a sealing of the lymphatics after the coagulation treatment are points worth considering. Willmoth advocated the electrocoagulation treatment using up to 3,500 milliamperes for destruction of tissue in cancer of the cervix."

Carcinoma of the Cervix: Treatment by a Combination of Roentgen Rays, Radium, and Electrothermic Coagulation. J. Thompson Stevens, M. D., Montclair, New Jersey, *Radiology*, January, 1928. Page 57.

The author under electrothermic coagulation says that "upon completion of the second series of roentgen treatments, the disease upon or within the cervix is destroyed and removed by means of electrothermic coagulation. This is a surgical operation and the term 'electrothermic coagulation' at once conveys to one's mind that there is a production of heat by an electric current of sufficient intensity to coagulate the tissue to which it is applied. The operating electrode is cold at all times, the heat appearing only in the tissues treated, and being caused by the oscillations of a high frequency current, the applicator in general being a pointed instrument. As compared with excision, it has the enormous advantage of destroying the malignancy before it is removed. It is impossible to overestimate the value of the fact that with coagulation the growth is removed as a dead mass of tissue instead of as a mass of viable cells. This, plus the fact that the lymphatics and blood vessels are closed, tends to remove the possibility of mechanical metastasis. Heat develops in the tissues treated because of their resistance to the flow of current. Therefore, it is progressively more penetrating the larger the amount of current used and the longer it is applied. The actual cautery, as we all know, rapidly heats to a very high temperature the tissues to which it is applied, the tissues becoming charred if treated long enough. But the actual cautery does not produce sufficient heat deep within the tissues, and, therefore, the results in the treatment of malignant lesions with the actual cautery fail coagulation. Electrothermic coagulation, like other operations, is painful and is done under a general anesthetic, generally gas and oxygen—never ether."

Electrothermic Methods in the Treatment of Inoperable Cancer of the Breast. Wm. H. Schmidt, M. D., Philadelphia, Pennsylvania, *Physical Therapeutics*, December, 1927. Page 569.

This author says in conclusion that "certain types of inoperable cancer of the breast are beyond hope of benefit from surgery or radiation.

"The electrothermic methods offer a chance for temporary relief to selected cases.

"Results have been a prolongation of life and relief from pain and suffering.

"Constant vigilance with prompt destruction of the first sign of recurrence are important, with the hope that it may be the last remnant of the disease."

Modern Treatment of Gonorrhea. H. W. E. Walther, M. D., New Orleans, *New Orleans M. & S. J.*, Vol. 81, No. 3, September, 1928. Page 199-204.

"Paraurethritis. * * * These glands are easily destroyed by one application of high frequency spark.

"Periurethritis. * * * If the abscess points urethrally, it can best be opened through an endoscope with high frequency spark.

"Cowperitis. * * * Diathermy to the perineum has materially helped me clear up these foci which are so inaccessible.

"Seminal Vesiculitis. * * * Besides massage diathermy is used in the obstinate types of both vesiculitis and prostatitis. No perfect electrode has yet been devised for this work but the V-shaped instrument that is placed via the rectum against the prostate with the other blade resting on the perineum is superior to others.

"Epididymitis. * * * Diathermy has materially reduced the number of epididymi that go on the abscess formation.

"Arthritis. * * * We depend upon rest and diathermy chiefly to promptly arrest the process. After all is said and done results will follow only if the primary focus of infection is recognized and efficiently treated. * * *

"Bartholinitis. * * * The application of diathermy by means of the needle electrode inserted into the duct and gland sterilizes both in a few seconds. * * *

"Skenitis. * * * Again the diathermy needle, employed through a urethral speculum or better through an electrically illuminated skenoscope, is the most valuable agent we have to sterilize these foci. * * *

"Endocervicitis. So much has been written within the past few years on diathermy and its value in endocervicitis that we need say little here. It is the one and only sure way to destroy gonococcal infections of the cervix and at the same time in no way injure tissue. Sufficiently intense heat will kill gonococci; that we know. With electrothermic high frequency we can obtain the needed degree of heat, within the tissues, for periods sufficiently long to destroy the bacteria."

Surgical Diathermy in Gynecology. A. David Willmoth, A. M., M. D., Louisville, *Physical Therapeutics*, January, 1928. Page 25.

This author says that "of the simpler cases, none are more outstanding than the common ones of cervical erosions. One treatment, by thoroughly desiccating all the red and eroded area, either with the bipolar current or with the unipolar, the last being preferable, will cure the patient. * * *

"The above treatment applies as well to cyst of the Nabothian glands. * * *

"Desiccation is again the treatment par excellence in handling that troublesome little but aggravating urethral caruncle. * * *

"Again, in abscess of Bartholin's glands we have in surgical diathermy a method of relief that far surpasses the radical excision. * * *

"Again, using the lighter form of energy from either the bipolar terminals or the unipolar, we have the surest and most satisfactory method of dealing with the condylomata that frequent the skin surrounding the vulvar outlet. * * *

"Desiccation also suggests itself in the treatment of chancroidal ulcers of the vulva. * * *

"Coagulation. We have the ideal way of destroying tissue to any amount we wish in a bloodless and, from a postoperative viewpoint, painless manner. In both lupus and tuberculous ulcerations of the vulva nothing destroys the tissue so nicely as coagulation by the bipolar method of the high frequency machine. * * *

"In the management of cancer, heat in sufficient amount is the one thing that will kill the cells that have become uncontrollable. * * *

"For the past five years all my cases of cancer of the vulva have been treated with electrocoagulation. * * *

"In cancer of the vagina, * * * the only agent known in surgery to kill cells in surrounding fields is heat in some form. Surgical diathermy, by making the tissues generate their own heat, offers the best chance of reaching the remote points of disease. * * *

"Cervical cancer is easily detected and, being of the less malignant form, is especially adapted to treatment by the use of the high frequency currents, electrocoagulation being much superior to the effort at destruction by the Percy method or the actual cautery."

Endothermy in Gynecology. Howard A. Kelly, M. D., Baltimore, *Journal Am. Med. Assn.*, September 24, 1927. Page 1028.

INDICATIONS

"(1) Cleaning up cancerous cervix either before inserting radium or before operation.

"(2) In exsecting a carcinoma of the vulva of whatever extent.

"(3) In destroying granuloma of the urethra and true caruncle. * * *

"(4) Bartholin's cyst or abscess; in destroying intra-abdominal, infected areas on the pelvic walls.

"(5) Localized pruritus by destroying the superficial layers of skin or mucosa. * * *

"(6) Cervical polyps.

"(7) Carcinomatous glands on the pelvic floor or about the iliac vessels. * * *

"(8) In disseminated papillomas in abdomen it is a sine qua non. * * *

"(9) Superficial vulvar blemishes, warts and moles. * * *

"(10) Intravesical bladder tumors. * * *

CONCLUSIONS

"The endothermic conception is as positively and aggressively surgical as the time-honored scalpel, ligature and suture, and tends largely to replace the first two—for centuries the recognized badges of our profession. The fine point of the needle forms such an admirable, delicate, controllable instrument that it makes any surgical knife seem clumsy by comparison.

"Its field par excellence is that of the malignant growth which, by and large, it covers more effectively than any older surgical method. The object is to destroy quickly by heat, within a defined area, all the suspected tissues by a perfectly controlled voltage and amperage.

"We are all only too well aware of the awkwardness of putting one operation on top of another in the same area at a later date, and such secondary supplementary operations are rarely satisfactory or thorough on account of scar tissue and hemorrhage. By this new procedure there is no objection to a series of follow-up operations.

"The value of this newer method, which we have tested for the last three years, is that it is quicker and more efficacious and in every way more attractive than our older procedures. It is a sort of long knife and fork manipulation which restrains the operator from direct contacts with the area under treatment. It dispenses largely with the time-honored but always objectionable ligature. With a mild antiseptic dressing the wound is cleaner and heals more quickly and it is usually far less painful. Hemorrhage is greatly lessened and controlled by applying the current to the vessel through the pointed forceps grasping it. *Experto crede.*"

Electrothermy in Gynecology. In *The Textbook on Gynecology* (1928 Edition), Howard A. Kelly, B. A., M. D., LL. D., and Grant E. Ward, M. D., Chapter XLVIII. Page 974.

Various forms of high frequency currents are described, also the technic commonly employed in both medical and surgical electrothermy.

A list of diseases is given and the effectiveness of this agent is evaluated.

"Gonorrhea—In view of the high susceptibility of the gonococcus to heat and the enhanced permeability of this agent as compared with chemicals, it would seem to be the means par excellence for destroying these organisms." It is said that the gonococcus is instantly destroyed at a temperature of 113° F. (45° C.) or at 104° F. (40° C.) prolonged for six to eight hours. The work of B. C. Corbus is mentioned and his special electrodes favorably commented on.

In urethritis it is stated that the "sedative effect is gratifying: on an average the gonococcus disappears from the urethra after one or two applications. Three treatments are usually sufficient. After diathermy treatment a para-urethral infection is much less likely, occurring in but one of forty-one treated by Corbus and O'Conor."

Technique is given for treating infection of Skene's and Bartholin's Glands.

In endocervicitis it is stated "this type of treatment is useful in acutely inflamed as well as in chronic gonorrheal cervices. The treatments are continued until the gonococcus is absent in five successive smears after which the patient returns twice a month for observation, one being made forty-eight hours after cessation of the menses." The reader is advised to consult this work to familiarize himself with the technique employed.

Infected Sinuses and Fistulas—"When located about the cervix or rectum, these are obliterated by the electric current, a long sharp electrode sterilizing the infection and promoting the growth of healthy granulations to fill the defect"—see book for technique.

Pruritis—A spark is used by the author and the surface desiccated. "If the disease is deepseated, the needle should touch or slightly penetrate the skin, the duration of the application is shortened by using a flat disc as an active electrode and treating larger areas at a time with the instrument in contact with the skin."

The author then deals with the treatment of chancroid, venereal warts, verucca acuminata.

The author in dealing with malignancy advises the use of radiations in addition to diathermy in some cases. "This insures a higher percentage of cures."

"In salpingitis medical diathermy is here used as an adjunct to the usual methods of treatment. The customary medical procedures are carried out with the addition of a through and through diathermic treatment. * * * The effect should be promptly and distinctly beneficial. Any increase in pelvic pain or an immediate elevation of more than 1% of temperature contraindicates further diathermy for a time. * * * Acute inflammations of the uterine adnexa contraindicate intracervical or intrauterine treatments (Corbus and O'Conor)." See book for further opinion.

Non-specific Infectious Diseases—Chronic and Cystic Cervicitis. "This can be treated by bipolar electrothermy, the active needle electrode being thrust into the cervix at various points until the diseased area is thoroughly coagulated. The dead tissue can then be curetted away or removed by acusector or scissors and the base desiccated to stop any oozing, or it may be left to be thrown off. We believe, however, that cauterization with a hot copper cautery is less likely to be followed by hemorrhage."

B. F. Schreiner (Archives Clin. Cancer Res. 1925) is quoted as follows: "The combination of implantation of the primary lesion with seeds and at times seed implantations in the metastases, with high voltage X-rays in addition, followed by electrocoagulation is the method of choice for the comfort of the patient as well as for the end results."

Then follows a discussion of the agent in papilloma of the cervix uteri.

In carcinoma the author states that "radium is the chief curative agent. Sometimes, however, electrocoagulation is an excellent adjunct, especially when a large cauliflower growth fills the vagina."

Bladder—"Electrothermic methods in gynecology here find one of their most interesting and often brilliant fields."

Conditions suitable for treatment include papilloma for which the author gives an outline of technique employed.

Ulcer—The author says "the results in the diathermy treatment of bladder ulcers are so gratifying and the technique so simple that the current is quickly applied with little discomfort and no anaesthesia. * * * The rapid change in the clinical picture is remarkable."

Dysmenorrhea—The author quotes Turrell of England as follows: "diathermy will give immediate and lasting relief in most cases of dysmenorrhea."

Clinical End Results Following Diathermy in Gynecologic Conditions. Mortimer N. Hyams, M. D., New York, *American Journal of Obstetrics and Gynecology*, February, 1928. Page 224.

The author in pointing out that there has been greater progress in surgical diathermy than in medical diathermy says that "many clinicians do not have the time, patience or inclination to apply the slower modality with the necessary persistence and attention to detail, so that cures are sometimes reported on insufficient evidence. * * * On the other hand, some gynecologists can see no merit, present or future, in medical diathermy. Reckless statements emanating from either the overenthusiastic observer or the nihilist are a detriment to clinical progress. * * *

"Diathermy should not be regarded as a cure-all. If used properly in selected cases, particularly in combination with other therapeutic agents, it is certainly of great value."

He then proceeds to outline his handling of certain conditions.

"Urethral Caruncle—Diathermy is an ideal method of treatment for caruncles.

"Condyloneata—Eighteen such cases have been treated with perfect results.

"Acute Gonorrheal Urethritis—In uncomplicated cases, diathermy has produced results which justify the opinion that it is the method of choice in these cases.

"Skene's Gland Infections—He has cured sixteen patients with diathermy.

"Bartholin's Gland Infections—Prefers surgical incision.

"Gonococcal Endocervicitis—His own experience has been 'so disappointing' that he has 'discontinued using it.'

"Dysmenorrhea—The results have varied considerably in these cases. * * * About 50% of 38 patients were relieved by diathermy.

"Parametritis—In these cases the results from diathermy have been extremely gratifying.

"Salpingitis and Tubo-ovarian Masses—I have treated 22 patients with definite adnexa disease, usually combining injections of non-specific protein with the diathermy applications. Anteroposterior or abdominovaginal electrodes were used, especially the latter; rectal electrodes were not used. Three only of the 22 patients came to operation. In two others the tumor mass persisted, though diminished in size, but the patients refused operation because their symptoms were relieved."

The Treatment of Leucorrhea. By Franklin L. Payne, M. D., Philadelphia, (from the Gynecean Hospital Institute of Gynecological Research, University of Pennsylvania) in *Amer. J. Obstet. & Gynec.*, XVII:6:841-848: June, 1929.

Diathermy has been employed in the treatment of cervicitis with varying degrees of success. Apparently in the hands of experts this procedure is of considerable value, especially in the milder forms of the disease.

In the John G. Clark Gynecological Clinic at the Hospital of the University of Pennsylvania the more severe cases of cervicitis have been treated by a plastic operation or by the employment of the cautery. Three types of treatment were utilized: cauterization, simple trachelorrhaphy, and the modified Sturmdorf operation. We have closely studied the end results obtained in 171 cases treated by one method or the other. This study shows that each of the three methods has definite indications and limitations, making it unwise that one should be employed to the exclusion of the others.

The cautery was routinely employed in cases of superficial laceration, simple erosion, and in uncomplicated cervicitis.

Trachelorrhaphy was performed in cases presenting simple unilateral or bilateral lacerations.

The modified Sturmdorf operation was employed in those cases in which the lacerations were multiple, or sufficiently severe to prevent anatomic restoration by trachelorrhaphy, in cases of hypertrophy both with and without Nabothian cysts and in a few cases of extensive cervicitis.

Of 171 cases of leucorrhea, the predominating lesion proved to be: cervicitis in 27, simple laceration in 24, multiple lacerations with erosions in 85, and hypertrophy with cystic changes in 35.

Cauterization gave 93 per cent cure or improvement in 70 cases. Trachelorrhaphy gave 96 per cent or improvement in 24 cases. In 77 cases the modified Sturmdorf procedure gave 95 per cent cure or improvement.

Physiotherapy, a Neglected Aid in Obstetrics and Gynecology. Albert C. Hirshfield, B. S., M. D., Oklahoma City, *Journal of the Oklahoma State Medical Association*, December, 1927. Page 327.

This author says that "if this or any other group of gynecologists or general practitioners were asked to name the two gynecological disorders most common and yet most difficult to successfully treat, nearly all would, I believe, reply that they were dysmenorrhea and endocervicitis, * * * and that physiotherapy, especially diathermy, has a very distinct field of usefulness in these disorders and in the majority of such cases will give quicker and more definite relief than any other form of treatment. * * * "

Diathermy and Menstruation. I. Von Büben, *Zentralblatt fur Gynakologie*, Leipzig, June 4, 1927.

Abst. J. Am. Med. Assn. (October 1, 1927). Page 1189.

In dysmenorrhea on a basis of genital hypoplasia, good results may be obtained from diathermy treatment given during the intermenstruum.

Diathermy as Adjunct in Treatment of Pelvic Inflammatory Disease. By L. C. Sheffey and W. H. Schmidt in *American J. Obst. & Gynec.*, 18:230: Aug., 1929.

Abst., in Jour. A. M. A., 93:12: Sept. 21, 1929.

Scheffey and Schmidt believe that whatever good diathermy accomplishes is due to the increase in circulation brought about by the local application of heat, rather than from any heat generated in the diseased tissues themselves, and surely not from any destruction of bacteria by heat. They do not agree with some observers that it should be employed in all cases of inflammatory disease irrespective of the severity of the infection and the degree of pelvic disease. Its use is contraindicated in the presence of complicating pelvic conditions as myoma uteri and ovarian cysts or tumors, nor should it be employed during menstruation or in the presence of profuse bleeding of inflammatory origin. They did not find, as did some observers, that pain was almost instantly relieved by its use. Sometimes it was increased for a time at least, and if markedly so, the applications were discontinued. Less technical difficulty was noted, however, in the operative cases preceded by diathermy, as evidenced by increased density of adhesions and their more ready separation. They were better satisfied with the use of the abdominosacral method than with the abdominovaginal, the application being simpler, and because of their belief that increased circulation is the principal factor in the benefit derived, rather than increased temperature in the tissues themselves which one might more likely expect a vaginal electrode to produce.

Diathermy in Pelvic Inflammation. By C. A. Robinson in *British M. J.*, London, 1:1072: June 15, 1929.

Abst. Jour. A. M. A., 93:4:335: July 27, 1929.

For the treatment of chronic pelvic infections and inflammations, Robinson believes that diathermy offers a new method that will avoid a long and tedious period of treatment with swabs, tampons and douches, will render mutilations unnecessary and will bring about recovery in some cases in which operation would not be likely to succeed. The cases in which recovery is likely after a comparatively short course of treatment are those of chronic salpingo-oophoritis without a rise in temperature or constitutional disturbances. The presence of pus is not necessarily a contraindication. The chronic pus tube may disappear as far as physical examination goes. Patients are likely to do well if there is evidence of infected cervix with or without erosion, and especially if there are gonococci present.

Pelvic Inflammation and Its Modern Treatment. By Henry Wilderman, Philadelphia, in *Med. J. & Rec.*, 130:3:130-133: Aug. 7, 1929.

Diathermy, according to Magill, Cherry and others, is regarded as the most efficient means at our disposal for relieving pain and resolving the pelvic masses in the secondary stages of tubal disease. The efficacy of diathermy depends largely on the location and degree of pathological involvement of the lesion. Generally it is believed that diathermy is a valuable adjunct in the treatment for almost all chronic inflammatory diseases. Surgery in these cases is either radical or conservative.

EYE, EAR, NOSE AND THROAT

Diathermy Operations for Carcinoma of Tongue. *British Journal of Surgery*, Bristol, 15:661 (April), 1928.

Abstract in The Journal of the American Medical Association, Vol. 91, No. 1, July 7, 1928. Page 58.

"The results that have been reported from the use of diathermy in the treatment of cancer of the tongue, Harmer says, are so encouraging that there can be no doubt that it is one of the best methods of treatment that has so far been devised. If the operation is properly carried out by the bloodless method, there is no danger of disseminating the growth."

Medical Diathermy in Chronic Middle Ear Deafness. D. McKenzie, *Lancet*, London, March 17, 1928.

Abst. J. Am. Med. Assn. (April 28, 1928). Page 1412.

An experimental trial of medical diathermy in chronic catarrh of the middle ear has so much diminished the deafness and tinnitus that McKenzie draws attention to the method in order that others may try it. In favorable cases improvement in the hearing and diminution of the tinnitus took place, and in one or two cases the change in the hearing occurred unexpectedly. In one instance, that of a medical man with increasing deafness of ten years' standing, the hearing for the tuning fork at the meatus rose from minus 20 seconds to minus 10 seconds after the fourth exposure to the current, and the improvement continued. The effect on tinnitus proved also to be full of surprises. In some it at once became much less loud, and one patient lost the noises altogether. In others an unusual fluctuation in the intensity of the tinnitus was noticed. At one time it would become louder than ever, at another it would be so soft as to be scarcely audible. But the tendency in these cases also has been for the noises to become, as time goes on, more and more subdued. At the same time the diathermy made, or seemed to make, the tinnitus much worse in one patient. One must, therefore, be guided by results. For how long a time the treatment should be continued also depends largely on results. Thus, in early mild cases, a few weeks of treatment will be sufficient, whereas it can scarcely be expected to relieve old obstinate cases of middle ear deafness for many weeks or even months.

Treatment of Furunculosis by Diathermy. J. Hunter, *Journal of Laryngology and Otology*, Edinburgh, August, 1927.

Abst. J. Am. Med. Assn. (October 22, 1927). Page 1460.

Hunter reports the case of a woman who was severely affected with furunculosis at longer or shorter intervals during three years. Both external acoustic canals were vulnerable to attacks. Treatment by diathermy was begun during a most severe attack. The left acoustic canal was occluded, and the pain was most intense. Tin electrodes 2-2, were held tightly against the ears, and the "heat of toleration" produced. In a minute or two the pain was relieved. Treatment was continued for fifteen minutes. The patient went home and slept soundly for ten hours. The pillow was saturated with pus when she awoke—the first spontaneous evacuation of pus. No sign or symptom of a furuncle has appeared since the first treatment a year ago. The treatment was continued at intervals for two months to insure immunity.

A Rational Treatment of Hypertrophic Rhinitis. Louis Feldman, M. D., *The New England Journal of Medicine*, May 17, 1928. Page 682.

"1. A monopolar high frequency current from the Oudin coil is applied by means of a non-vacuum flat nasal electrode and is inserted into one side of the nose. * * * It is kept there for about ten minutes, thus producing, after this preliminary treatment, a rather marked hyperemia of the previously pale, boggy hypertrophied membrane. * * *

"2. A flat copper nasal electrode covered with cotton and moistened is then applied against the tissues intra-nasally and attached by means of an insulated wire to the 'active' positive pole of a galvanic apparatus, the larger indifferent moistened pad, size 6 x 4, coming in contact with the patient's chest in the sternal region anteriorly. * * * Then the current is gradually turned on, taking into consideration both the patient's feelings and the milliampere meter reading. The average dosage used was about three to eight m.a. for about ten minutes; then the entire process preceded by the high frequency treatment is repeated in the other side of the nose. * * *

"The average number of treatments given was ten. The interval between treatments was about forty-eight hours. The average duration of treatment was twelve minutes. In the 50 cases observed and treated, the results were as follows: Relief or improvement was first noticed after about the fourth seance, manifested by both symptoms and signs, subjective and objective. * * * Our conclusions were as follows: Total number of cases treated, 50; total number of treatments given, 512; total number cured, 28 (56%); total number improved, 12 (24%); total number unimproved, 10 (20%)."

Treatment of Bronchial Asthma by Diathermy of Spleen. R. S. Gassoul, *Ann. de Roentgenol et Radiol.*, 2:226, 1927

Abst. Am. J. Roentgenol (December, 1927). Page 593.

This method of treatment was first used by the author in November, 1924, in a case of severe asthma in which the usual remedies had not done the least good. It was more successful than he had dared hope. The patient had a severe attack after the fourth treatment but after the fifth treatment his condition began to improve, the attacks were further apart and milder. After 15 treatments the attacks stopped entirely, the patient gained weight and was able to go back to work.

The diathermia was applied with a Neothermo-flux apparatus with a current of 120 volts. The electrodes measuring 7x8 cm. or 8x9 cm. were applied, one in front over the spleen and the other on the back at the level of the 9th, 10th and 11th ribs; 10 to 30 treatments were given two to three times a week with 0.8-2 amperes. The patients were followed closely and the treatment individualized carefully. In order to avoid suggestion a false diathermia was given first.

Brief notes are given of 13 patients, 4 men and 9 women, from thirteen to forty-three years of age. General conclusions cannot be drawn as the number of cases is too small. The results were equally good in these cases. The method of diathermia of the spleen is harmless and sufficiently effective to be recommended, particularly in cases in which other methods, including roentgen therapy have failed. The author intends to make a further study of the effect of diathermia on other endocrine organs, including the thyroid, suprarenals, hypophysis and sex glands.

The Treatment of Malignant Lesions of the Eyelids. By William L. Benedict, M. D., and Mary Knight-Asbury, M. D., Rochester, Minn., (Section on Ophthalmology, the Mayo Clinic, Rochester, Minn.) in *New York State Jour. Med.*, 29:11:676: June 1, 1929.

Roentgen rays are effective in certain superficial tumors of low grade malignancy, but this form of treatment has been inferior to radium in most cases of epithelioma of the lids and is now seldom employed alone. It has been found that heat is a very effective agent in the destruction of epithelioma cells and we have used the actual cautery following excision of large malignant lesions, such as exenteration of the orbit, and the galvano-cautery to remove smaller tumors. Surgical diathermy has been used in a number of small lesions on the margin of the lid, with less deformity than would have resulted from excision, and the end result has been satisfactory. The contraction of the scar, which is smooth, tends to make the margin of the lid even, with but little loss of tissue in cases in which a rather large coloboma would have resulted from excision.

We have found the most effective method of eradicating malignant lesions of the lids to be excision followed by radium, by surgical diathermy or by fulguration. In many of the cases some form of ineffective irradiation or operation has been given previously.

Comparative Value of Physical Measures in the Treatment of Chronic Purulent Otitis Media. A. R. Hollender, M. D., Chicago, Illinois, and M. H. Cottle, M. D., Chicago, *Clinical Medicine and Surgery*, September, 1927. Page 692.

These authors in their conclusion say that "rational therapy for chronic purulent otitis media assumes an understanding of existing pathologic changes. A Diagnosis is all important, for results will often depend on the careful exclusion of certain systemic diseases.

"Orthodox measures, while sometimes successful in arresting chronic aural discharge, frequently fail in producing a cure, so that physical therapy is worthy of a trial.

"Radiant heat-light is advantageously employed in acute suppurative otitis media.

"Ultra-violet radiation is useful in selected cases of the chronic type but cannot be depended upon as a routine method.

"Zinc ionization is the most effective single method of combating uncomplicated chronic suppurative otitis media in which the perforation is central and large enough to allow the zinc solution to pass into the middle ear.

"Diathermy is useful, especially in difficult cases or as an adjuvant to zinc ionization when the latter is ineffective in producing the desired result.

"X-ray treatment of chronic aural discharge has failed to give the encouraging results claimed by some investigators.

"General ultra-violet irradiations, because of their systemic effect and when employed in connection with local measures, sometimes prove advantageous in aiding the arrest of stubborn middle ear suppurations."

The Treatment of Chronic Deafness. Harry M. Thometz, M. D., Chicago, *Illinois Medical Journal*, Vol. LIV, No. 1, July, 1928. Pages 59-62.

Read before Section on Eye, Ear, Nose and Throat, Illinois State Medical Society, Moline, June 1, 1927.

"Of prevailing practices in the treatment of chronic deafness I want to mention,

"First: Negative galvanism in the external auditory canal, on the theory of softening a hardened ear drum and adhesions and stiffness in the chain of ossicles.

"Second: Postive galvanism, applied through the nose to the pharyngeal orifice of the eustachian tube on the theory of inducing shrinkage of the mucous membrane and re-establishing tube potency.

"Third: Sinusoidalism, on the theory of inducing electrically and forcibly contractions and relaxations of the tensor tympani and stapedius muscles in order to mobilize the ossicular chain.

"Fourth: Mechanical vibration, as by the use of a pneumatic vibratode. * * *

"Fifth: Acoustic exercise. * * *

"Sixth: The use of radium. * * *

"Eighth: Diathermy has been a much advocated remedy. * * *

"To reach the middle ear effectively, electrodal contact with the drum itself is necessary. Ellis G. Lynn accomplished this by a special head piece and needle shaped electrodes wrapped in moist cotton and inserted into the depths of the external canals. For myself I prefer the use of lead moulds manufactured in several sizes appropriate to different sizes of ears, configured to the hollow of the concha and fitted with protuberances that extend into the depth of the external canal as far as the isthmus. * * *"

The Treatment of Carcinoma of the Tongue by Radiodiathermy. Sir W. Milligan. *Brit. M. J.*, 1926, ii, 1902.

Milligan's article is summarized as follows:

1. Whenever possible, immediate surgical removal of the primary growth and of the lymphatic field draining the focus of infection should be done.
2. When surgical intervention is deemed impracticable, an attempt should be made to remove the growth with the diathermic knife or to destroy it by gradual coagulation with button- or spike-shaped electrodes.
3. When removal of the growth is contra-indicated, the insertion of unscreened radium tubes into its substance should be done.
4. Combined treatment by means of diathermic coagulation and radium implantation at times gives gratifying results.
5. In early cases the lymphatic field upon the affected side, and in advanced cases the lymphatic field upon both sides, should be removed by a surgical operation.
6. Irradiation of the lymphatic field should be an invariable postoperative procedure and should be done preferably by the implantation of screened tubes or alternately by surface applications or X-ray therapy.
7. No preliminary irradiation should be employed if glandular deposits are to be removed by ordinary surgical procedures.
8. The diathermic cautery knife presents many advantages as compared with the scalpel for the removal of a cancerous tongue.

Treatment of Epithelioma About the Face, Mouth and Jaws. Earl C. Padgett, M. D., Kansas City, *Missouri Medical Association Journal*, May, 1928. Page 190.

This author says that "in the surgical treatment of cancer in this region besides the scalpel and the cautery knife, the electrocoagulation method by use of the bipolar high frequency current, has now entered the field as an addition to our surgical armamentarium. The proper use of this method of excision and dissection depends upon the same basic principles as surgery. Chief among the advantages of the method are the ease of exci-

sion of tissue en masse, a lessened threat of emboli of malignant cells, little bleeding, slight postoperative pain and the possibility of follow up operations if such are needed. * * *

"In cancer of the tongue and neighboring intra-oral mucosa wide excision of the local growth with cautery knife or by electrocoagulation methods can be fairly advocated. Those moderately advanced cases in which the clinical picture is of rapid growth and biopsy shows the growth to be in group 4 (Broders), radium application is probably preferable."

Epidermoid Carsinoma (Epithelioma of Lip). Dr. Eugene P. Pendergrass, *Radiological Department—University and Philadelphia General Hosiptals, Surgical Clinics of North America,* February, 1927.

The author uses Radium with excellent results in this work but in all epithelioma measuring at least 1 cm. in diameter feels treatment is not complete unless lesion is removed by endothermy.

Reviews modalities employed and says, "endothermy should be an excellent agent in the removal of malignant growths and when combined with radiation, we feel that the best results are obtained." Employs bipolar and endotherm knife and operation done day following irradiation.

Electrocoagulation in Surgery. William D. McFee, M. D., Boston, Mass., *The Industrial Doctor,* September, 1927. Page 337.

The author in this article gives his technic in several case reports and the use of electrocoagulation "for the removal of a papillary carcinoma * * * at the base of the tongue," and in a case "for the removal of an extensive leucoplakia involving the cheek adjacent to the left lower jaw."

The Use of Endothermy in Laryngology. By Harold G. Tobey, M. D., Boston, in *Arch. Otolaryng.,* 10:3:276-281: Sept., 1929.

For laryngologists' purposes there are three distinct ways in which the various high frequency currents delivered by the machine are used in electrosurgery: (1) superficial dehydration or desiccation; (2) cutting and (3) tissue coagulation.

1. For superficial dehydration the Oudin current is used. The active electrode is held, not in actual contact with, but sufficiently close to, the tissues to be dehydrated, so that sparks are sprayed across the intervening space.

In practice this current is satisfactory when the space is sufficient to guard against injury to the adjacent tissues, and may be used in the supraglottic space and on the upper surfaces of the cords.

2. For cutting purposes, the active electrode is energized by a different type of current. The cutting is done not by the electrode, which has no sharpened edge, but actually by the current which forms ahead of the electrode an electrical arc which by volatilizing the tissues separates them as though they were cut.

3. For heating the tissues en masse, electrocoagulation, the kind of current differs widely from that employed for cutting. An electrode energized with coagulating currents instead of having cutting properties cannot be moved through the tissues. The tissues surrounding the electrode become heated to a depth depending on two factors, the density of the current and the length of time it is permitted to flow. If a large tissue mass is to be coagulated, a comparatively weak current must be used for a prolonged period, until it becomes heated throughout.

When the lesion to be treated is well above the cords, local anesthesia with exposure of the larynx by the laryngoscope is the method of choice.

General anesthesia is preferable for the treatment of lesion of the cords.

The danger of ether explosions seems to be entirely obviated by the complete removal of all ether from the vicinity of the patient and a waiting of at least three minutes before proceeding with the application of the current.

The one outstanding advantage of the method is the soft, pliable elastic scar which results—a scar with little if any surrounding fibrous tissue.

Indications

Malignant Disease—In inoperable or extrinsic cancer a certain amount can safely be done to alleviate suffering.

Angioma—The results obtained from the use of electro-surgery in angioma in the nose are encouraging for its use in the larynx.

Cysts—There is no question but that with sufficient practice the escharotic effect of the electric current can be much more easily controlled than is the case with the usual escharotics.

Varix of the Vocal Cord—The results are eminently satisfactory, an invisible scar remaining.

Papilloma—The removal of the tissue by instrumentation with direct desiccation of the base. The results from this procedure were much more satisfactory.

The danger of transplants can be obviated to some extent by coagulation of the tissue before its instrumental removal.

The Management of Malignancies in Otolaryngology. By Joseph C. Beck in Annals of *Otology, Rhinology and Laryngology,* March, 1928.

Abstr. in Ohio M. J., xxv:3:195-7: March 1, 1929.

Technique of Surgical Diathermy

The patient is prepared as for any other type of major surgical procedure. The anesthesia is varied to suit the individual case. Where simple coagulation of the growth is all that is to be performed, the region is rendered anesthetic by either nerve block or infiltration anesthesia. When a more extensive operation is performed the patient is given the benefits of synergistic analgesia, which is a modified rectal anesthesia used in conjunction with subcutaneous injections of morphin and magnesium sulphate. Occasionally, patients are somewhat refractory to this anesthetic and it will require supplementary anesthesia with interrupted chloroform inhalation. Ether, for obvious reasons, is to be shunned.

Incision—We make the incision with the so-called radio knife. Our machine has various modalities for varying degrees of electrocoagulation and desiccation. The high desiccating current is used for the incision. After the proper adjustments, the instrument is tried out on a piece of raw meat before operation. The knife should be so adjusted that the skin tissues seem to fall apart in the way of the advancing knife. No bleeding is encountered unless a larger vessel is severed. This may be closed by direct sparking to the bleeding point or it may be caught with a hemostat and the current applied to the hemostat, direct, and even a ligature may be necessary.

One should be very careful as to the manner in which the indifferent electrode is attached to the patient's back. It must lie in very firm contact and the spot should be moistened with soapy water. Adhesive and bandages should be applied to make the contact firm. Poor contact or a slipping, indifferent electrode will be certain to produce a severe burn to that region and such an accident would prove embarrassing to the surgeon were he asked for an explanation. The electrical constants vary in the type of machine used. In the instrument employed by us, the autotransformer is set at about 10 and the lowest voltage terminal is used. The spark gap is adjusted to read about 1200 milliamperes. These figures may be varied to suit the individual case.

Coagulation

When the incision has been performed and the growth isolated for the actual coagulation, or "cooking," the active electrode is changed from the knife type to the needle type. We prefer the Planke needles. These are made in various lengths and also fit the handle which holds the knife loop. The medium or high voltage terminal is used, depending upon the depth of coagulation required, and the autotransformer set at 6 or 7. The spark gap is opened to read between 1,200 and 1,400 milliamperes. The needle is plunged into the neoplasm and the current turned on until an area of coagulation occurs about the needle. The current is then closed and the needle plunged into the adjacent tissue and the performance repeated.

When a large part of the tumor has been treated in the manner described, the resulting coagulum is removed by scraping with a curette until moist and bleeding tissue is reached, when the coagulation is resumed. This is continued and the entire tumor destroyed. We must be sure to remove the entire growth, and even go into the healthy tissue. Bleeding is frequently encountered and is stooped in the manner above described. When the entire neoplasm is destroyed we prefer to coagulate the base with the Holmgren electrode or button. In the coagulation of the cavity of the antrum, Holmgren recommends the use of two similar elec-

trodes, the active and inactive, in close proximity to one another within the cavity. The reason for this procedure is to avoid passage of all the current through the mass of tissue from the back of the antrum, thus obtaining a more efficient action.

The reaction from this type of treatment is surprisingly mild and the systemic reaction is practically nil. The reasons for this are explained by various writers differently. My own belief is that there is very little bleeding, and consequently, not much chance for retentions, infections, and resorption. The cut surfaces are surely sterilized by the heat. The lymphatics are undoubtedly sealed by coagulation. The after-treatment varies in each individual case; however, certain generalities can be made. It always takes a long period for the wounds to cleanse themselves. The exudate should not be removed mechanically. The odor is rarely of the putrid character, as it is from actual cautery or from a regular surgical operation in and about the cavities of the nose, mouth and throat. Should putrefaction or bad odor be present, balsam of Peru or mercurochrome will take care of this.

Following surgical diathermy about the bony cavities, there is always considerable sequestration expected. Whenever a loose piece of bone is found, it should be removed because healing cannot take place until all the dead bone is removed. Excessive granulations are kept down by surgical diathermy or by the aid of silver nitrate. It is well to remove small bits of the granulations during the healing process and send these to the laboratory for the checking up of possible recurrences.

Electrodesiccation and Electrocoagulation in Neoplastic and Allied Diseases of the Oral Cavity and Adjacent Parts. By William L. Clark, M. D., Philadelphia, in *Am. J. Surg.*, vi:3:257-275: March, 1929.

Electrothermic methods are strongly contraindicated in extensive lesions that cannot be destroyed with one operation. If any of the disease is left, it will usually be stimulated to greater activity. If vital structures are involved, irradiation is preferred to electrothermic methods.

It is quite necessary to treat lymphatic drainage areas in the neck by radium, roentgen ray, or, in some instances, a combination of both, to inhibit or destroy malignant cells migrating to the glands, or to destroy the pathologic element, if metastasis is already present.

Other Advantages and Indications

In addition to the desiccation or coagulation of the affected tissues and the sealing of blood and lymph channels, the heat penetrates beyond the area actually destroyed and devitalizes malignant cells, without permanently impairing the healthy tissue, thus lessening the likelihood of local recurrence or metastasis and conserving the maximum amount of normal tissue. The relief from pain and comparative freedom from post-operative discomfort are worthy of note. This is probably explained by the destruction of the sensitive nerve endings.

The desiccation and coagulation methods are certainly superior for general use to the so-called radio knife, or high frequency cutting current, the heat from which does not penetrate the tissues far beyond the point of contact. The latter method has, however, a definite field of usefulness, but this will not be discussed here.

Malignant cells, especially those that are least differentiated, are more vulnerable to heat and are devitalized at a lower degree of heat than are normal cells. The thermic sensitiveness to the action of the high frequency current has often been observed clinically and demonstrated histologically.

The pratice of intentionally treating a malignant lesion by a series of desiccation or coagulation operations is reprehensible and must be discouraged, unless, through error in judgment or for some other reason, an incomplete operation is performed the first time, and a second becomes necessary to complete the work. It is quite as irrational to do this intentionally as to expect success by excising a cancerous growth surgically in a series of operations. Therefore, it should be the aim to complete the work with one operation if possible.

Desiccation is a most satisfactory method of treatment of infected tonsils, especially in adults, if the operation is correctly performed. If the technique is not good, poor results will be obtained. This method has been disapproved by some operators, but examination of their technique has revealed the cause of their

failure. If properly done, the method will bear the most critical examination. This statement is made after thoughtful consideration of facts, based upon twenty years of observation and experience with the desiccation method in tonsil work.

Neoplasms of the oral cavity possess, in general, the same characteristics and manifest the same behavior as tumors arising elsewhere. The relative degree of their benign or malignant nature is influenced to a considerable extent by the anatomic and functional properties of the structures involved. For a better interpretation of the nature of neoplasms in general, and those of the oral cavity in particular, one must take into account not only the clinical and histologic data, but also the biologic elements concerned in the development and growth of the tumor.

Summary and Final Remarks

Twenty years of intensive study and experience have demonstrated to me that malignant disease within the mouth and adjacent parts, while always a most serious affection, is not necessarily hopeless, since many brilliant results are obtained by the judicious employment of combined methods, of which electrodesiccation and electrocoagulation are most important, indeed are, on pure merit, entitled to hold first place in treatment of primary lesions.

Operative surgery is also considered indispensable, and is constantly employed by me to ligate blood vessels and to resect bone. In certain instances cervical lymph nodes are surgically resected, but never before the malignant element has been inhibited, or when possible, entirely destroyed by pre-operative irradiation treatment. A gastrotomy is often performed to insure proper feeding in undernourished patients, owing to difficulty in deglutition before the operation and during the convalescent period. Many radical electrothermic operations have been rendered possible by this preliminary gastrotomy. Operative surgery has a still greater field of usefulness in cancer involving other parts of the body, which will be discussed in another paper.

Radium and roentgen rays are used in my practice in connection with neoplasms in the locations under consideration principally to control metastasis to the cervical lymph nodes, and their value for this purpose has been definitely established. The primary lesions are, with certain exceptions (cases in which vital structures or those very important to conserve are involved) best treated by the electrothermic methods, and I have had no cause to regret this practice after critical comparison of results of different methods in many cases.

This histology of malignant lesions within the mouth and elsewhere is often a determining factor in prognosis, and also a guide to treatment, since embryonic, fully differentiated and intermediate cells require different treatment, especially in relation to irradiation; for example, squamous cell epithelioma, grade 4, which cells are undifferentiated, though most malignant, respond more readily to the roentgen ray and radium treatment than grades 3, 2 or 1, which are in different stages of differentiation. This is explained by the slight resistance to these treatments by the embryonic cells and the greater resistance as the cells approach the adult grade. Many pathologists do not yet appreciate the significance of this differentiation, nor do they recognize the different grades under the microscope. A check of many cases in which histologic studies have been made during the past twenty years has demonstrated to me beyond a doubt that it is important to know definitely the grade of the tumor and that there are certain characteristics of staining that positively identify the grades.

Finally, permit me to state with assurance that electrodesiccation and electrocoagulation employed in their proper place are the most important measures for the successful treatment of primary neoplastic and allied lesions of the mouth and adjacent parts, though operative surgery, roentgen ray and radium are also valuable as described, in their respective roles, each complementing the other.

Electrocoagulation in Tumors of the Oropharynx. L. Leroux and P. Tilman, *Progres Medical*, Paris, October 29, 1927.

Abst. J. Am. Med. Assn. (January 21, 1928). Page 243.

The absence of hemorrhage, of cancerous embolism, of absorption of toxins, and of wound infection are some of the advantages of electrocoagulation in the treatment of tumors of the oropharynx. The patient suffers little or not at all from operative shock, and the operation under local anesthesia gives no pain.

Electrocoagulation does not create special resistance in the tissues, hence several short sittings may be given until the limit is reached. One disadvantage of the method is that during the application, one cannot tell how deep the thermocoagulation is reaching. In the bones and cartilages inexactness may lead to osseous or cartilagious necroses. Serious secondary hemorrhages and osseous necrosis are fortunately rare, but postoperative edema is inevitable. The treatment is suitable only for epitheliomas. Epitheliomas of the tonsil and of the soft palate are most favorably influenced. Neoplasm of the floor of the mouth may be treated with diathermy. Leroux and Tilman have a case so treated in which there has been no recurrence in fifteen months.

Treatment of Trachoma by Surgical Diathermy—Preliminary Report. Dudley C. Kalloch, M. D., Leninakan, Armenia, *Journal Am. Med. Assn.*, October 29, 1927. Page 1511.

This author says that "the results of desiccation as originally performed on five children last September were rather dramatic. All these children had had trachoma for several months, and following operation were discharged as apparently cured within three weeks. Subsequent cases have shown greater variability in results, some having required two or three such treatments, but in practically all cases there has been marked improvement in the condition of the lids and in symptoms."

Nasal Accessory Sinus Disease—A Survey of Available Treatment Methods with Special Reference to Physical Therapy. A. R. Hollender, M. D., and M. H. Cottle, M. D., Chicago, Illinois, *Illinois Medical Journal*, August, 1927. Page 106.

This author says that "in acute sinusitis radiant heat light to the head and face or indirect diathermy over the sinuses, relieves the acute symptoms and frequently obviates the use of analgesic drugs.

"In subacute and chronic sinus disease, direct diathermy, properly applied, is the method which thus far has given the most satisfactory results and therefore is a decided advance in sinus therapy."

Adjuvant Action of Diathermy in Nasal Accessory Sinus Disease. Charles R. Brooke, M. D., *Physical Therapeutics*, April, 1928. Page 183.

In conclusion this author says that:

"1. Experience shows the early use of diathermy to prove that sinus disease can be eradicated before the involved structures are irreparably damaged.

"2. The use of diathermy in sinus infection has shown a degree of recovery resulting that frequently surpasses all expectation.

"3. Diathermy with other physical measures combined or singly applied in sinus disease has, to some extent, replaced the older measures of treatment.

"4. Many cases have shown that a prompt and adequate relief can be obtained by the use of diathermy in otherwise seemingly incurable sinus conditions, and this has brought about much appreciation from patients who have availed themselves of this effective form of treatment."

Indications and Limitations for Physical Therapeutic Methods in Otolaryngology. By A. R. Hollender, M. D., and M. H. Cottle, M. D., *Arch. Physical Therapy*, Vol. IX, No. 9, September, 1928. Pages 395-7.

These authors say in part: "In general it may be said that for acute infections either radiant heat, light or infra-red energy is the safest and most effective measure. Thus in acute otitis media (2) and in acute nasal accessory sinus disease (3) good results have been obtained.

"Electrocoagulation for the destruction of tonsils has not been perfected sufficiently to replace surgical tonsillectomy as a routine procedure.

"Either electrocoagulation or electrodesiccation is of decided advantage for properly selected cases in which for some reason surgery is contraindicated.

"Probably a more certain indication for surgical diathermy in otolaryngologic practice is malignancy involving such structures as the tonsil, the larynx and occasionally the accessory sinuses. There can be no argument that electrocoagulation is the treatment of choice for tumors of the tonsil."

Tonsillectomy. Modified and Original Technique. By Howard V. Dutrow, M. D., Dayton, Ohio, in *Arch Otolaryng.*, 9:5: 532-533: May, 1929.

Nonsurgical Substitutions—Electric coagulation, electric needles, electro-desiccation, the radio knife, etc., ad infinitum have a limited field of practical use. They should be used only pending a favorable time for complete operation. Some laryngologists previously enjoying a favorable reputation have succumbed to the appeal of unscientific claims of the manufacturers of electrical apparatus and have proclaimed to the public through front page newspaper articles the wonderful virtues of the new operations. That as time goes on some of these electrical substitutions will find a limited place in the field of otolaryngology is not to be doubted, but it will be a slow process and will have to be supported by sound clinical evidence. To my mind, at the present time there is no substitute for a complete tonsillectomy performed in a strictly surgical way.

One should be cautious in accepting the relative merits of many of the electro substitutions, because their field of usefulness is limited at the present time. One must not forget that when a piece of tonsil remains—whether it has been partially cooked by an electric apparatus or left after tonsillectomy—it is just as much a potential source of systemic infection as though no part of the tonsil had been removed.

Tonsils and Adenoids. By French K. Hansel, M. D., St. Louis, in *Arch. Otolaryng.*, 9:5:566: May, 1929.

Following a recent discussion of the "tonsil problem of the aged" at a meeting of the Philadelphia Laryngological Society, "sensational notoriety" is said to have been given to a method of removing tonsils by electrocoagulation or desiccation which was advocated by a member during the discussion. The Society has since passed a resolution stating that it does not officially endorse the method nor approve the publicity given the matter, and that it disclaims all responsibility for opinions expressed in the discussion on removal of tonsils by this method.

In 1921, Novak and Zeller reported the results obtained in a small series of cases in which the tonsils were coagulated at the Cook County Hospital. It was decided to study a series of 100 cases, but in only 7 was it attempted because of the results obtained. One case is reported in detail in which a portion of diseased tonsil was hidden in the scar following desiccation.

The procedure known as electrodesiccation of the tonsils was carried out by one skilled in the technic. A piece of diseased tonsil was covered by a fairly thick, smooth, white scar. The appearance of the throat some time later was such as to warrant a laryngologist in saying that there had been a complete removal of the tonsil. It may be said that portions of diseased tonsil were frequently left following surgical tonsillectomy. That is true, but it is only by electrodesiccation that such fragments can be so completely hidden from view.

In spite of the improvement which has been made in the technic of destruction of the tonsils by high frequency current, Novak and Zeller do not see any evidence of sufficient validity to change their opinion that the method is inadequate and unsatisfactory, and that it cannot in any manner compete with the accepted present day method of surgical tonsillectomy.

Tonsillectomy by Electrocoagulation. Philip H. Greeley, M. D., Portsmouth, N. H., *The American Journal of Surgery*, October, 1927. Page 375.

This author gives his technic for electrocoagulation and says that "the patient does not have to take an anesthetic, is not made ill, can go about his tasks, and can eat and enjoy life as usual; no matter how badly infected the tonsil or how acute the inflammation, treatment may be started. Instead of stirring up the infection and increasing the toxic absorption electrocoagulation or surgical diathermy actually destroys the infection in the part of the tonsil not coagulated, so it often happens that the tonsil takes on a healthy appearance before it is completely destroyed. By this method the tonsil may be removed completely and by having the patient come to the office after a year it is easy to keep the throat free of lymphoid tissue if any should develop."

Electrocoagulation of the Tonsils. By Harold B. Waring, M. D., Pittsburgh, Pa., in *Hahnemannian Monthly*, Vol. LXIII, No. 12, December, 1928. Page 917.

"Electrocoagulation is not here advocated as a routine procedure

but as a method of value for patients who fear surgery or cannot afford to be hospitalized. In the great majority of cases dissection is to be preferred as a more rapid and less annoying method."

The Use of the D'Arsonval Current in the Removal of Tonsils. Julian Buff, M. D., Atlanta, *The Journal of the Medical Association of Georgia*, February, 1928. Page 62.

This author says that with "a veder loop with a detachable metal tip, the shaft part of the instrument being insulated, that the tonsil could be engaged more easily than with a tip made of hard rubber. * * *

"The patient is anesthetized in the ordinary way and the cone and ether removed from the room. The mouth gag placed in and the tonsil engaged in the detachable loop which has been previously described and the detachable ring removed from around the tonsil. This leaves the tonsil caught in the wire loop, a number 4 wire preferably, of a Beck instrument with the wire insulated down to the tonsil with hard rubber.

"The wire of a high frequency current machine is attached to the Beck instrument and then the tonsil is caught with a pair of insulated forceps except the tip which serves as the positive pole and then the current turned on with a foot switch and the wires in the Beck instrument pulled taut until the tonsil is removed, which requires about three or four seconds. * * *

"With this way of removal the tonsil fossa should be a glistening red surface with white dots about over the field which are the ends of scar and connective tissue which held the tonsil in the fossa. * * *

"Bleeding does not occur and the tonsil fossa are left absolutely dry. * * *

"Healing is quicker. * * *

"Scar tissue and contractions are not present afterwards. * * *

"Sealing of the lymphatics * * * is an important factor preventing the influx into the system of toxins. * * *

"In general anesthesia only about one-fourth the amount of ether is used. * * *

"The ease with which the tonsils are removed this way. * * *

"After trying several high frequency machines I find that the Victor is the best because the current can be more easily regulated and the current is the smoothest."

Electro-Sterilization of the Tonsils. W. L. Cahall, M. D., Palestine, Texas, *Texas State Journal of Medicine*, January, 1928. Page 594.

This author uses "indirect diathermia directly to the tonsil, and for lack of a better name called this procedure electro-sterilization.

"It is not the intention in this procedure to fulgurate or sear the tonsil, but to establish within the tonsillar structure as high a degree of internal heat as the patient will tolerate. Thus all micro-organisms that may be present are killed. The tonsil is sterilized, fibrosis is eliminated, swelling and inflammation subside and the patient experiences a grateful improvement in the feeling of the throat following the first treatment. It requires from 12 to 15 treatments to effect a cure. The treatments may be given daily or even twice a day."

Surgical Diathermy of the Tonsils. E. M. Frecker, M. R. C. P. E., M. B., Ch. M. Kiama, N. S. W., *The Eye, Ear, Nose and Throat Monthly*, May, 1928. Page 195.

In general conclusions this author says:

"1. The use of surgical diathermy for the elimination of tonsils is satisfactory with correct technique and more especially when electrodesiccation is used.

"2. Electrocoagulation is an operation to be used only in very expert hands and then only with great caution and strict limitation of the current and its effects to the tonsillar tissue.

"3. A gradual elimination of the tonsils is the procedure of choice.

"4. Much of the disagreement in the literature arises from the insufficient appreciation of the importance of correct technic and of the difficulty of limiting heavy currents in their action."

PEDIATRICS

Some Clinical Experiences with Physical Therapeutics in the Practice of Pediatrics. Margaret R. Reynolds, A. B., M. D., Jackson Heights, New York, *Physical Therapeutics*, May, 1928. Page 228.

"Diathermy too can be used to advantage in treating young patients. Its application in various joint and bone conditions is the same as with adults. Forbes has recently reported favorably on the use of diathermy in ninety-six cases of pneumonia in young infants. I have a case now under observation where diathermy is apparently helping to clear up an unresolved pneumonia, complicated by pleural adhesions and dilatation of the left bronchus. * * * "

Diathermy in the Treatment of Pneumonia in Children. R. P. Forbes, *Archives of Pediatrics*, June, 1927. Page 349.

(This abstract from P. H. Medical Survey, September, 1927.)

Our impression has been that diathermy has been of most value in bronchopneumonia, but a study of all the case records of pneumonia in the hospital for two years preceding the use of diathermy compared to the past year in which most of the cases of pneumonia have received diathermy treatment, shows that the mortality of both lobar and bronchopneumonia has been reduced about one-half, in those cases receiving diathermy treatment.

Physical Therapy of Poliomyelitis. P. Duhem, *Rev. Med. de la Suisse Romande*, Geneva, August 25, 1927.

Abst. Jour. Am. Med. Assn. (November 19, 1927). Page 1819.

During the febrile period, serotherapy should be used. After the temperature has fallen, the patient should be given two series of roentgen-ray treatments of four sittings each; diathermy is given every second day for two months, then after six weeks' of rest another two months' series is given, and so on during the whole period of retrogression of the disease.

Treatment of Anterior Poliomyelitis. H. J. Wyckoff, M. D., Seattle, Wash., *Northwest Medicine*, Vol. XXVII, No. 6, June, 1928. Pages 274-275.

Diathermy and other forms of heat may be used, and give definite relief in some cases.

The Therapeutics of the Rheumatic Child. J. Epstein, M. D., New York, *Archives of Pediatrics*, August, 1927. Page 517.

This author states that "the treatment of the various types of arthritis depends upon the underlying condition", and says that "diathermy, massage and other forms of physiotherapy should be tried".

Anterior Poliomyelitis. A Study of the Acute Stage with special reference to the Early Diagnosis and Treatment. By Rex L. Diveley, A. B., M. D., Kansas City, Mo., in *Jour. Bone & Joint Surg.*, 10:11:1: January, 1929: 104.

During the stage of recovery, it was definitely shown that complete rest of the affected parts in casts and splints, during the first four to six weeks, was by far the best form of treatment. But this period should not be prolonged. The period of complete rest should be gauged by the disappearance of the muscle soreness and rigidity. When these symptoms disappear, light massage and individual muscle training should be started. Electricity and the salt-water tub may be added. Many cases showed some benefit by heat from an incandescent light, suspended from a cradle over the affected part. Picard and others, have reported good results by the use of diathermy. Bordier, Philips and Galland, and others, have noted striking recovery with the use of the roentgen ray during this stage. With these agents, the author has had little experience and feels that they should not be condemned until tried.

New Treatment of Infantile Paralysis. H. Bordier, *Acta Psychiatrica et Neurologica*, Copenhagen, 1927.

Abst. J. Am. Med. Assn. (October 29, 1927), Page 1562.

The principal factor in Bordier's treatment of anterior poliomyelitis is radiotherapy of the affected segment or segments of the spinal cord, begun as soon as possible after the febrile period. The dose is about 200 R units (French?) in children under 3 years of age, gradually increased to 1,000 R units in adults,

screened through 6 mm. of aluminum. A series of three irradiations is given, followed by an interval of twenty-five days; two or three series are thus administered, according to the gravity of the case. Secondly, diathermy is administered to promote nutrition of all the paralyzed parts. It is applied from the beginning independently of the irradiations and continued till normal temperature returns. Finally, a low voltage current of the desired frequency and wave form is used to assist in restoring paralyzed or atrophied muscles to normal; it is continued over a long period. He finds that this combined treatment considerably improves the prognosis in the gravest forms of anterior poliomyelitis and is effective in most cases of moderate gravity.

Spondylitis Deformans or Marie Strumpell Osteo Arthritis. By H. W. Snyder, M. D., Denver, Colo., in *S. W. Med.*, 13:2:69: February, 1929.

The treatment of spondylitis deformans is, in most cases, very difficult because many of these cases are not recognized as such until the disease is fairly well advanced. Therefore, I want to insist that in all instances, prevent (with a proper fitting appliance or brace) the deformity which is so liable to occur.

Diathermy and Electrotherapy

The patient is treated for a period of a week or ten days with diathermy. Intensive through and through treatment is required and it is important to cross fire whenever possible. Bone offers more resistance to the passage of the high frequency current and is very slow to heat, but it retains the heat for hours, slowly giving it up to the surrounding tissues. The minimal period of treatment is 30 minutes but it is extended to 45 minutes whenever possible. The size of the electrodes and the methods of applying them will vary with the part of the spine involved. The length of each treatment and the position in which the patient is placed, are important details. Pain is usually markedly relieved within the first three or four treatments. After this, stimulation and exercise of the muscles of the spine are begun by means of an evenly surging sinusoidal current.

Very small active electrodes permit the different muscles to be picked out and exercised separately. The number of contractions should seldom be more than ten a minute. The time of application is gradually increased, not to exceed five minutes, but it is desirable to keep the daily average around three minutes.

When polarity as well as exercise is desired, the pulsating direct galvanic current may be substituted for the sinusoidal.

Exercises are advised by some, but I believe they should be used with care. Massaging of the muscles helps in some instances; stretching is beneficial in most instances, both in relieving the pain and muscle spasm and in preventing deformity. The table or bed is made to conform somewhat to the deformity and the straps are placed about the shoulders as in treating fractures with weights. This is done daily for from 15 to 45 minutes. Occupational therapy is of value, such as having the patient weave while standing and reaching above his head, or his work should be at least as high as the level of his eyes.

DERMATOLOGY

A Case of Hypertrophic Acne Cured by Coagulation. Section on Dermatology, *Urol. & Cutan. Rev.*, 33:10:703, October, 1929.

Clodomiro Lettieri (La Semana Medica, June 27, 1929) describes the case of a man 71 years of age who had a typical case of hypertrophic acne, of several years standing, and for which diverse remedies had been tried without apparent relief. The author determined to try the coagulation current as a last resort. The author gave the patient a course of three treatments after which a perceptible improvement was noted. Several photographs of the patient are presented from which the efficacy of the treatment may be judged. The writer maintains that electrocoagulation at the present time offers the best means of treating this disease.

Some Valuable Methods in the Treatment of the Common Facial Dermatoses. Oscar L. Levin in *Medical Journal and Record*, Vol. CXXVII, No. 12, June 20, 1928. Pages 663-666.

"Results in acne follow best, in my experience, with a full course of sixteen treatments, given in fractional doses of one

quarter units once weekly. * * * However, if there is a recurrence, a few additional exposures will effect a cure. The necessity for additional x-ray treatment, however, can be obviated by immediately following the course of treatments with exposures to the ultraviolet rays. These rays are of some value in acne, but are of best service when used after the patient has received x-ray therapy rather than before. If exposures to the rays from the mercury quartz lamp are then given in conjunction with soothing and astringent lotions, the result is excellent. * * *

"Besides radium, however, we have another very valuable agent for treating various types of growths, namely, endothermy or electrodesiccation. * * *

"Endothermy or electrodesiccation is accomplished by means of a cold electrode in the form of an ordinary sewing needle in the proper handle conducting a high frequency current directly into the growth. * * * There is no hemorrhage, nor opening of lymph channels. Scarring is reduced to a minimum. Because the implement is so fine, and the trauma to surrounding tissue so slight, it is ideal for removing small growths around the corners of the mouth and eyes and on the eyelids themselves. It is also ideal in precancerous dermatoses of the face, senile keratoses, small verrucae and moles.

"Endothermy, it must be understood, is entirely different from fulguration which sparks and destroys by caustic action. Endothermy destroys by dehydrating the cell through the production of heat in the tissues from within.

"For the more superficial lesions, monopolar endothermy is indicated. The needle touches or penetrates the lesion. In deep seated lesions and malignancies, however, bipolar endothermy with its low voltage and high amperage, resulting in coagulation, is better. The wet pole is attached to the patient's wrist or thigh and the needle or endothermy knife is inserted deep into the lesion, after a protective ring has been formed around the lesion with the needle.

"Of course endothermy has one advantage over radium, as far as the patient is concerned—the results are achieved promptly. * * *

"In dealing with verrucous nevi, x-rays and radium are frequently inadequate, because such large doses are required for a permanent cure that they become dangerous. Electrocoagulation and curettage are recommended for their treatment. * * *

"In the port wine nevus, a very good procedure, if radium is not used, is to first treat with the Kromayer light under pressure, and later to follow with applications of carbon dioxide snow."

Status of Premature Alopecia. By Jacob Spitz, M. D., Boston, Mass., in *Urol. & Cutan. Rev.*, Vol. 32, No. 11, November, 1928. Page 755.

This author says in part: "The ultraviolet ray is useful, provided that there has been sufficient loss of hair to favor the access of the rays to the scalp. If the hairs obstruct the rays, this treatment is of little or no value. Diathermy is in my opinion, of great value in the treatment of this condition, in which it acts as a stimulant."

A New Concept of the Management of Carbuncles. A. David Willmoth, M. D., Louisville, *Kentucky Medical Journal*, August, 1927. Page 414.

Willmoth emphasizes that electrocoagulation in carbuncles surpasses the old treatment of the knife or cautery.

Treatment of Roentgen-Ray Epithelioma. E. Marques, *Presse Medicale*, Paris, July 23, 1927.

Abst. J. Am. Med. Assn. (October 29, 1927). Page 1559.

Epithelioma in Radiologist cured by Bordier's method undertook diathermic coagulation of the epithelioma. There was perfect cicatrization with excellent result.

The Use of the Monopolar Current in Skin Blemishes. A. E. Schiller, M. D., Detroit, *Archives of Physical Therapy X-Ray Radium*, November, 1927. Page 569.

This author says that the types of cases that he has treated are:

"1. The pigmented nevi and hairy nevi. In the hairy nevi always remove the hair first, because if you don't the patient will have a nice long beard.

"2. Telangiectasis. In the telangiectatic area, when they are arranged like a spider web, place the needle in the center of the lesion, and it is gone for good.

"3. Senile keratosis. Those are the brownish, roughened areas that we see in people advanced in age and sometimes in people not so advanced in age, simply a senile change in the skin. Every time you see a lesion of this kind, destroy it, because it is precancerous. These can be destroyed with a very superficial desiccation and destroyed permanently without scarring.

"4. Plantar Warts. You have all had some experience with plantar warts. Occasionally they clear up very brilliantly with x-ray treatment. We had a case recently who had gotten no results by x-ray. We desiccated and got beautiful results. They are very easily taken care of by desiccation, but in case of a plantar wart always warn your patient that the base of that lesion is not on the skin. It is down underneath, and if you remove the surface of the wart it does absolutely no good. You can't get results unless you do go down to the base.

"5. Filiform Warts. Filiform warts will shrivel up and disappear and won't give you much trouble.

"6. Lupus (tuberculosis of the skin). I think these do as well with desiccation as with any other method. Lupus is a very stubborn disease. If you want to destroy thoroughly, use desiccation and follow by the quartz lamp therapy, including general body radiation by the air-cooled ultra-violet ray.

"7. Neoplasms. All types of neoplasms can be handled very satisfactorily, but you must remember that in the large neoplasm radium and x-ray are also to be used."

The Use of the High Frequency Current in Dermatology. By Herbert S. Alden and Jack W. Jones, Atlanta, Ga., in *M. J. & Rec.*, Vol. 128, No. 12, December 19, 1928. Page 649.

"The high frequency currents which may be obtained from the better machines on the market today are invaluable to the dermatologist. When used correctly, carefully and conservatively, it is the simplest and best type of treatment for a variety of skin diseases. For the treatment of small tumors of the skin, nevi, pyogenic granuloma and verucae it is unexcelled. Basal cell epithelioma when in the proper location may be completely removed, bloodlessly and rapidly, with an excellent cosmetic result. Tuberculosis verucosis cutis yields readily to the deep coagulating current, the diseased areas being removed thoroughly and quickly. Because the coagulation can be controlled at almost any depth, potentially malignant growths can be removed without fear of malignant dissemination.

"It seems that the high frequency currents have made a place for themselves in the armamentaria of the dermatologist and when properly and carefully used will greatly facilitate the treatment of a limited but large group of skin diseases."

Pigmented Growths of the Skin; Their Significance and Treatment. By A. Benson Cannon, New York; Read at the Annual Meeting of the Medical Society of the State of New York, at Albany, May 23, 1928. Published in *New York State J. M.*, 29:14:857: July 15, 1929.

In his summary this author says:

The congenital nevi irregular in shape, color and surface markings and the acquired type occurring in the papular form are usually the types that give rise to melanocarcinoma, and should be radically removed with the endothermic knife as soon as they make their appearance, the wound being left open to granulate. Where the lesion is removed early and thoroughly in this manner, I believe that there is very little likelihood of the development of a melanocarcinoma.

Any lesion that shows evidence of growth, change in color, surface markings, irritation or ulceration should be immediately and radically removed.

Of three cases of proved melanocarcinoma removed with the endothermic knife by wide excision of the growth and the wound left to granulate there has been no evidence of recurrence in 6½, 5½ and 5 years respectively. A fourth case in which a tumor was removed 4½ months ago is also free from evidence of metastasis.

Physical Therapy in Heroes Zoster. By W. Vignal in Paris Medical 1:373: April 20, 1929.

Abst. in *Jour A. M. A.*, 92:26:2197: June 29, 1929.

Vignal considers roentgen therapy of great value in the treatment of the pain occurring in herpes zoster and of the pain that persists for months as a sequel of herpes zoster. The roentgen

rays have a strong resorptive action on the round cell infiltration of the spinal ganglions and of the posterior spinal roots, corresponding to the region of the herpes zoster, whereas even the largest doses of roentgen rays have no effect on the nervous tissue itself. Usually after the first or second roentgen irradiation of the corresponding segment of the vertebral column, an exacerbation of the pain is observed, of which the patient should be informed in advance. However, the pain improves after the third irradiation and usually disappears completely after from 5 to 6 irradiations. The recovery of the patient may be accelerated by the use of diathermotherapy or of diathermotherapy combined with electroionic aconite treatment after the pain has decreased, and the skin of the patient can tolerate the contact of the electrodes. By this method the author cured many patients, one of whom, a man, aged 64, with chronic neuralgic sequelae of herpes zoster, refractory to other treatment, and cured after six diathermic treatments, is reported on by him.

Efficacy of Diathermy in the Treatment of Lupus Vulgaris. By H. Bordier, *Revue Gen. de Clinique et de Therap.*, Paris, 42:641, October 6, 1928.

Abst. in Jour. A. M. A., Vol. 91, No. 21 (Nov. 24, 1928). Pages 1668-9.

"Bordier describes two cases of lupus vulgaris that had been treated for years with success by various methods; both cases were cured in a short time with electrocoagulation. The author believes that electrocoagulation is the best form of treatment for the majority of cases of lupus vulgaris. One reason for the superiority of this treatment is the fact that the high temperature not only produces a change in the tissues in which the tuberculous lesion has developed but also destroys the tubercle bacilli. Another good feature of this form of treatment is the fact that the resulting scars are supple."

Diathermy Treatment of Local Pruritis. By O. Hopfinger in *Wiener Klinische Wochenschrift*, Vienna, 41:849, June 14, 1928.

Abst. in Jour. A. M. A., Vol. 91, No. 8, Aug. 25, 1928, page 604.

"Eleven cases of stubborn pruritis were treated by Hopfinger with diathermy. In eight, cure was obtained; in two, cure was not complete at the end of the course and the treatment is being continued with one sitting weekly; improvement is evident. In only one case did it fail. The treatment is contraindicated in the presence of eczematous or pyogenic lesions in the skin."

High Frequency Currents in the Treatment of Diseases of the Skin. By W. Knowsley Sibley, M. A., M. D., B. C., Camb., M. R. C. P., Lon., in *Urol. & Cut. Rev.*, 33:9:601-602: Sept., 1929.

The applications are usually made through a glass vacuum electrode, held in contact with the skin, the affected areas being slowly brushed over.

They are very useful for the immediate relief of itching in almost all pruritic conditions, whether due to definite dermatoses, or purely neurotic causes.

Either local or general skin lesions which are irritable, such as the various dry eczemas will be rendered much more comfortable and a violent irritation will be rapidly relieved by passing the vacuum over the parts for a few minutes.

Many of the chronic cases will be benefitted by prolonged treatments with the vacuum electrodes.

Neuralgic skin affections, such as those associated with an attack of herpes zoster are relieved by these currents.

Chronic leg ulcers may be improved in time by the application of the vacuum electrode.

High frequency is especially useful in the many forms of alopecia.

Physical Therapy in Diseases of the Skin. Dr. Charles E. Cook, Jr., Calais, Maine, *The Journal of The Maine Medical Association*, November, 1927. Page 207.

This is an excellent article well illustrated and considers the treatment of epithelioma. He uses "the water-cooled lamp which soon cleans up the mixed infection and hastens proliferation of healthy cells at the margins. * * * This is supplementary to the routine treatment by X-ray. In the squamous cell type the patients are seldom seen before some metastasis has taken place. In these instances, surgery, or what is infinitely better, surgical diathermy, should be used for immediate extirpation, followed by broad radiation with the X-ray. * * *

Chronic Ulcers—This author says that these "ulcers resulting from varicose veins are stubborn indeed to ordinary treatment, but the mixed infection and indurative eczema always complicating them can usually be cleaned up by actinotherapy. I have had some brilliant results of late by alternating this with medical diathermy, using the through and through method in preference to the cuff method for application of electrodes. * * * I often shield the surrounding area and apply the water-cooled lamp directly to the ulcer and follow with the air-cooled lamp. Crusts from dried secretions and necrotic fascia must absolutely be cleared away at each treatment. * * *

Treatment of Certain Diseases of the Skin. Herbert H. Bauckus in *Medical Journal and Record*, Vol. CXXVII, No. 12, June 20, 1928. Page 669.

This author says that "It is usually much easier to cure an epithelioma of the skin than to cure a plantar wart. * * * In spite of good technic some of the warts do not respond to x-ray or radium. If two or three treatments do not suffice to cure it is practically useless to continue this method of treatment. Electrodesiccation will destroy some of these warts."

INTERNAL MEDICINE

Angina Pectoris. Dr. P. F. Botton, *The Lancet*, London, January 28, 1928.

In reporting the meeting of the Royal Society of Medicine section on Electrotherapeutics, this author says that "a further important group of patients were subjects of angina pectoris. In those with high blood pressure, diathermy was a valuable therapeutic agent. * * * Another type of angina was labelled 'secondary angina,' in which was no structural disease. Here it was probable there was a nutritional disturbance of the heart function, and the origin of it might be toxic. Patients whose pain prevented them carrying on their usual vocation, but who showed no sign of disease were helpfully treated by diathermy, though other treatments were also good."

Angina Pectoris. G. R. Brow, M. D., Research Fellow in Cardiology, McGill University, *The Canadian Medical Association Journal*, October, 1927. Page 1139.

This author says that "diathermy has recently been proven to be of considerable benefit in these cases and it is given for 15 or 20 minute periods twice or three times a week for a month or six weeks".

Angiopathies and Diathermy. A. Zimmern, *Progres Medical*, Paris, October 22, 1927.

Abst. J. Am. Med. Assn. (January 21, 1928). Page 243.

The setting in action of the peripheral vasodilator reflex by generalized diathermy diminishes the work of the heart. The degree is not the same in all subjects. Generalized diathermy is of value in hypertensions of the young, of the overworked, of heavy eaters, of the plethoric as well as in those of the menopause. Migraine, headache, buzzing in the ears, effort dyspnea are all favorably affected by this treatment. Transcardiac diathermy is efficacious in pain of coronary origin. Intermittent claudication and Raynaud's syndrome are both benefited by diathermy. Hepatic diathermy is scarcely known, except as a sedative procedure in biliary tract pain or in pain produced by adhesions. It has been used in cases of stasis in the abdominal viscera. In poliomyelitis it has become a classic. It is indicated in certain edemas and for the treatment of internal hemorrhoids.

Physical Therapy in Dermatology. By E. William Abramowitz, M. D., New York, N. Y., Assistant Professor of Dermatology and Syphilology, New York Postgraduate Medical School and Hospital, in *Clinical Med. & Surg.*, 36:4:225-232: April, 1929.

Surgical Diathermy—(Endothermy)

Desiccation is useful in brown nevi, adenoma sebaceum, fibroma, telangiectasia, xanthelasma, leukoplakia, karatoses, the different varieties of warts, molluscum contagiosum and chancroids. It is advocated by some for the removal of superfluous hairs, instead of electrolysis.

Coagulation is preferred in granuloma, pyogenicum, anatomic tubercle, lupus vulgaris, rhinophyma and ulcerations of radiodermatitis. * * * Malignant lesions that have failed to respond to other methods, especially radium or X-rays, are to be removed as thoroughly as possible, irrespective of the resulting scar.

Autocondensation Therapy. B. B. Grover, *Arch. Phys., Ther., X-Ray, Radium*, Mar., 1927.

Abst., in J. Am. Assn. (June 4, 1927).

Grover asserts that the dominant agent in reduction of blood pressure is autocondensation. Autocondensation is a valuable method of treatment in cases of acute alcoholism. Some patients with anemia are benefited by local autocondensation over the solar plexus. Very mild dosage of autocondensation seems to benefit aneurysm of the aorta, the results being due principally to an equalization of the circulation which relieves the strain on the crippled artery. In the cases of toxemia so often called rheumatism, the patients are practically all benefited by autocondensation. Cold extremities are benefited. Tesla autocondensation for fifteen minutes followed by local autocondensation to the pancreas sometimes reduces blood sugar. Headaches from toxic causes, insomnia, locomotor ataxia, angina pectoris and arteriosclerosis are benefited by this treatment.

Diathermy in Arthritis Deformans. Letter to the Editor *Jour. A. M. A.*, 92:22:1883: June 1, 1929.

To the Editor:—I have been asked whether a treatment of an old arthritis deformans by means of intravenous injections of some formic acid preparation followed by the use of diathermy is justified. A woman aged about 55 has been suffering from the disease for about 25 years. I understand that the nonspecific treatment of arthritis deformans has given rise to serious reactions in a number of cases. As this question lies outside my special knowledge I would like to have your advice in the matter. Please omit name.

M. D., Ohio.

Answer.—Many years ago there was a popular idea that "bee stings" helped rheumatism. Homer Swift of the Rockefeller Institute tried formic acid injections with negative results. Some severe reactions have occurred following the use of salts of orthoiodoxybenzoic acid. Arthritis deformans is the terminal stage of infectious arthritis, and treatment by protein shock has in general been futile. Diathermy has been of benefit in selected cases.

Management of Gonorrheal Arthritis. By J. Albert Key, St. Louis, Mo., in *Southern M. J.*, 22:5:469-471: May, 1929.

This author says in part: "Local heat applied in the form of baking or diathermy is often used in these cases and affords some comfort to the patient, but I have not been able to convince myself that it has any effect upon the course of the disease. The same is true of gentle massage and of Bier's hyperemia.

Arthritis, Medical and Surgical Treatment. Clinic of Drs. Charles Murry Gratz, Irving Sherwood Wright and Ian Mackenzie, New York Post-Graduate Medical School and Hospital Physiotherapy, by Dr. Herman G. Wahlig, The North Country Community Hospital, Glen Cove, N. Y. Reprinted from *Surgical Clinics of North America*, Vol. 8, No. 2, April, 1928, in *The Industrial Doctor*, Vol. 6, No. 7, July, 1928. Pages 134-5.

"Diathermy—This form of therapy relies mainly on raising the temperature of the part treated. Dependable diathermy machines give adequate high-frequency current, with ample and sufficient oscillations to penetrate the tissues and produce the necessary heat within the joint. It is often used following the application of radiant light and heat. Two electrodes are employed, and if it is desired to concentrate the heat at one particular point they may be of unequal size, the heat concentrating nearer the smaller electrode. The current should be gradually increased for the first ten minutes until the maximum is reached, the average treatment requiring thirty to forty minutes. The sensation of the patient is the most reliable guide to the amount of current that can be tolerated, while the exact amount of current passing into the tissues will be indicated by the milliamperemeter."

Physical Means in the Treatment of Arthritis. By F. H. Ewerhardt, St. Louis, in *Jour. Mo. M. A.*, Vol. 26, No. 1, January, 1929. Pages 7-10.

"It is understood that these measures are to be used as adjuvants and in connection with other recognized forms of therapeutics as drug therapy, specific and non-specific therapy, diet, and possibly surgical procedure. Also that the causes of the disease must be looked for and removed.

"In the early stages of the disease the inflammation and pain are often very acute; the indication here is complete rest.

"The external application of heat and cold forms the basis of many physical procedures. The source of heat may be the sun, water, artificial light and electricity. * * * Radiant heat is not deeply penetrating, but is more so than convective heat. Infrared refers to an invisible ray which is derived from any black body sufficiently heated.

"A much more desirable contrivance is the so-called diathermy, a high frequency current. * * * We recently ran a series of experiments by placing on the abdomen and sacrum, respectively, of female patients, suitable electrodes. A thermometer was placed in the cervix under proper control. After a period of twelve to fifteen minutes the temperature in the cervix rose to 104 degrees. This seems to dissipate the assertion which has been made, that diathermy is not a through and through heating process."

Influence of Electric Current and Peptone on Blood Platelets and Clotting. C. A. Mills, *Chinese Journal of Physiology, Peking*, July, 1927.

Abst. J. Am. Med. Assn. (October 29, 1927). Page 1555.

Mills states that passage of an electric current through blood or plasma containing platelets accelerates clotting, whether the blood is freshly drawn, or citrated and recalcified.

Action of Diathermy in Calcified Subdeltoid Bursitis. Joseph F. Harris, M. D., New York, *Journal of the Am. Med. Assn.*, October 10, 1925.

"E. M., a man, aged 52, a musician, was referred to me, Jan. 21, 1925, complaining of a painful left shoulder with inability to raise his left arm from his side. He stated that this condition had been present seven years with intermittent attacks of inability to raise the arm. The roentgenograms verified the diagnosis of calified subdeltoid bursitis. (January 19.) He received his first treatment January 21, and at the end of two weeks' treatment he was able to resume his occupation, that of a musician, playing a bass violin in a symphony orchestra. Some pain, however, persisted, and it was necessary in all to give him thirty-two treatments, at the end of which time all the symptoms, namely, pain and restricted motion, had disappeared. Roentgenograms were again taken, April 6, and showed an absorption of the greater part of the deposit. These pictures, forming the case record, show the diagnosis and the result of the treatment by diathermy.

"The accompanying illustrations show conclusively that diathermy is a curative measure and not a palliative one. A long series of cases treated over a period of years has shown a complete restoration of function and an absence of pain. It is therefore fair to assume that in each case the greater part of the deposit has been absorbed by this form of treatment. If not completely absorbed, it has been reduced to such a size that it does not interfere with the function of the shoulder. Up to this time I have not seen a recurrence. I do not hesitate to say that this is the treatment *par excellence* for this condition."

Electrical Treatment of Subdeltoid Bursitis. By Norman E. Titus, M. D., New York, in *Am. J. Surg.*, vi:3:320-321: March, 1929.

The technique was evolved of placing the patient on an autocondensation pad and administering high frequency electricity of such quantity that the meter read about 900 ma. This patient was anesthetic over the bursa and could not detect the heat when too great. The writer therefore decided that the best guide to dosage was to place his own finger over the bursa and ground the high frequency current through the operator's finger.

In conclusion it can be stated from a personal experience with over 150 such cases, that the combination of general heat to the shoulder, as from an incandescent lamp, to increase the efficiency of the high frequency current which is next administered as grounded autocondensation and then followed by the application of the static current as an effluve, can be relied upon to relieve all forms of bursitis, either acute or chronic.

Intermittent Claudication: Treatment by Diathermy. A. W. Gill and L. N. Moss, *Lancet*, London, October 29, 1927.

Abst. Jour. Am. Med. Assn. (December 17, 1927). Page 2147.

Gill and Moss report a case in which diathermy produced good general and local results. The patient felt much better and was relieved from pain. The ability to walk was restored. Thus far, there have not been any further attacks.

The Management and Treatment of Mucous Colitis. Louis H. Levy, M. S. M. D., New York City, *The Quartz Lamp*, September 15, 1927. Page 68.

Extracted from Physical Therapeutics, February, 1927.

"The treatment consists of the regular exposure to the air-cooled mercury vapor lamp. * * * Two treatments weekly are given, the total number of treatments being from sixteen to twenty-four. When adhesions are present, it may be found necessary to add diathermy over the part involved using the plates anteriorly and posteriorly with the regular diathermy technique. By this means it is possible to obtain excellent results if not cures in as many as 90% of the cases. * * * "

Colitis—the Spastic Type. By E. L. Eggleston in *Bul. Battle Creek San. & Hosp. Clin.*, 24:2:90: April, 1929.

Electrical measures, such as diathermy to the pelvic colon, or high frequency applied by the rectal electrode, may be helpful in selected cases.

The Developing Relations of the Physical Sciences to Dentistry, Medicine and Pharmacy. G. W. Crile, M. D., Cleveland, Ohio, *Illinois Medical Journal*, September, 1927. Page 200. Commencement address given before graduating classes of the Schools of Pharmacy, Dentistry and Medicine, of the University of Illinois, June 11, 1927.

"In cases of hemorrhage and surgical shock diathermy holds a place second only to that of blood transfusion. Diathermy may be applied to any part of the body, but the most convenient and efficient method of energizing the body as a whole is to place a plate on each foot so that the high frequency current, in passing from pole to pole, will pass through the fluids and tissues, converting electricity into heat at the points of resistance—namely, at the boundaries of the cells."

Gastric and Duodenal Ulcers. G. Bucky, M. D., *Medical Clinics of North America*, January, 1927.

Dr. Bucky reported use of a new X-ray method of treating these ulcers by irradiating the skin so as to stimulate the autonomic nervous system, thereby influencing the splanchnic organs, and states that he has had very encouraging results in some long-standing cases. He also mentioned the beneficial effects of diathermy in this form of ulceration.

Effect of Diathermy on Gastric Acidity. L. J. Brody, *Arch. Phys. Ther., X-Ray Radium*, Mar., 1927.

Abst. in J. Am. M. Assn. (June 4, 1927).

A preliminary report is made by Brody on an experiment undertaken with the purpose of determining the effect of diathermy on gastric acidity. He says that subjecting the stomach at frequent intervals to low milliamperage with medium voltage over a long period of time tends to increase gastric acidity, both free and total. In conditions in which there are pathologic changes of the gastric mucosa there is an increase in acidity immediately after subjection to diathermy, returning to the normal of that animal within a short period of time. Low voltage cannot be used, because of its injurious effect. Higher milliamperage with medium voltage seems to produce a definite picture as far as gastric acidity is concerned. There is immediately on stimulation a rise in both free and total acidity. This is followed by a period of depression of varying duration, and subsequent to this a rise in the acidity. The longer the periods of subjection to diathermy and the shorter the interval between treatments, the shorter is the period of depression in acidity.

Diathermic Treatment of Right Pericolitis. By Gaston-Durand and L. Delherm in *Presse Med.*, 37:93: January 19, 1929.

Abst. in *Jour. A. M. A.*, 92: 12: 1025: March 23, 1929.

Gaston-Durand and Delherm used diathermy for the treatment of 21 patients with right pericolitis, all complaining of con-

stipation and more or less severe pains in the right side of the abdomen. Four of the 21 patients had already been operated on for chronic appendicitis, but without any effect. After from 26 to 68 diathermic treatments, ten of the patients were either markedly improved or remained cured for a long time (one for three years), after the diathermic treatment was discontinued. The authors ascribe the effect of the diathermy to the amelioration of the intra-intestinal and extra-intestinal congestion and edema that produced a compression of both motor and sensory nerves. Therefore, it should not be used alone but should be combined with rest, an adequate regimen, autovaccinotherapy and sedative medication.

Report of Meeting of Royal Society of Medicine, Section of Electrotherapeutics. *The Lancet*, London, January 28, 1928.

Dr. E. P. Cumberbatch, commenting on the use of diathermy, said "the result in circulatory disturbances was due to the heat generated and what was important was the acceleration of the circulation through the tissues. One result on the blood of the application of heat was a lowering of its viscosity. Possibly the heating of the skin and the cutaneous nerve endings produced a reflex vasodilatation of the blood vessels of the interior. Some cases of intermittent claudication, he agreed, did well under diathermy, but others did not. The cases having hypertension which reacted best to diathermy were those in which renal disease was not present. Still, by applying diathermy to the kidney region specially, so as to promote the flow of blood through the organ, he had derived some success even in these cases."

Hyperpiesia. A. H. Douthwaite, M. D., *Guy's Hospital Reports*, January, 1928. Page 59.

In dealing with treatment the writer says "the treatment of hyperpiesia by diathermy produces, as a rule, satisfactory immediate results, but unless the patient is able to take repeated courses, the blood pressure will be found to mount again to its original level. Like most forms of treatment the earlier the case the better and more lasting the result."

Diathermy and Hypothermia. Abstract in *American Med.*, xxiv: 3.187: March, 1929.

In hypothermic debilitated, lymphatic and underweight patients, diathermy may provide in the form of calories the necessary heat energy for combustion of their alimentary ration, according to Bergonie. This nutritive stimulation can amount to 3,000 calories in an hour. It is particularly useful in conditions of "physiologic misery," athrepsia, in hypothermia due to malnutrition in cancer cases, after hemorrhages and for the chills which follow traumatism of the nervous system. Results are very exact: The oxygen consumed is reduced from 1. 2.95 to 1. 2.14 and the CO_2 from 1. 2.12 to 1. 1.96. There is, therefore, a definite economy in organic combustion and clinical improvement is always apparent. Temperature and weight improve, strength increases, the digestive condition improves and the general defensive mechanism of the organism functions better.

Physical Measures in the Treatment of Industrial Injuries. U. V. Portmann, M. D., Cleveland, *International Journal of Medicine and Surgery*, May, 1928. Page 242.

This author says that "we have extended the application of diathermia to the treatment and prevention of shock, as it provides a simple and easy method of applying heat to areas that cannot otherwise be reached. This procedure is based upon certain investigations which were made several years ago by Crile and by Nagleschmidt."

The Principles of Diathermy, with Report of Cases. Frank H. Walke, M. D., in paper read before the Bexar County Medical Society. *Medical Record and Annals*, Vol. XXII, No. 6, July, 1928. Pages 142-3-4.

Dr. Walke says in part: "Among the diseases amenable to treatment by diathermy are traumatic conditions of the muscles, bones and joints; acute and chronic gonorrhea, prostatitis; neuralgia, neuritis, lumbago, sciatica; pneumonia, pleurisy and bronchitis; osteomyelitis and joint conditions; dysmenorrhea, amenorrhea, and many other gynecological conditions. Again, with surgical

diathermy or electro-coagulation, cancers, tumors, warts, moles, tonsils and hemorrhoids are successfully treated.

"The contraindications of diathermy are very few. The most important are: the presence of active hemorrhage, circumscribed pus or pregnancy, a recent hemorrhage from a tubercular lung, a gastric or duodenal ulcer, are conditions in which diathermy should not be used. It should never be used in obscure inflammatory conditions of the abdomen, or where pus without drainage is present. In pregnancy and eclopic gestation diathermy should never be permitted."

Medical Diathermy. By F. Nagelschmidt, in *Arch. Physical Therapy*, 9: 499, November, 1928.

Abst. in Jour. A. M. A., 92:1:85: (Jan. 5, 1929).

Nagelschmidt sees in diathermy an agent that can be applied with good results to all organs in which glands sometimes lose their function. One can influence not only the salivary and sweat glands but also parenchymatous organs, such as the liver, the pancreas, the spleen, the kidneys and the thyroid. He describes its use in the treatment of arteriosclerosis, angina pectoris, asthma, pneumonia, pleuritis and nephritis. He says that the application of diathermy to a kidney in a state of chronic inflammation means practically the same as decapsulation. The decapsulation of the kidney means nothing less than relieving the kidney of an enormous pressure, to produce a relatively normal circulation. Diathermy application from the outside is all that is necessary to produce the same effect as a decapsulation, decongest the organ, and reproduce a good healthy arterial circulation. He testified to its beneficial effect on the pancreas in diabetes, or in thyroid treatment for myxedema or for hypothyroidism, and to its value when too little epinephrine is produced, as in the treatment of the suprarenal glands.

Physical Therapy in Acute Pulmonary Diseases. *Atlantic Medical Journal* 31: 529-624 (May), 1928.

Abstract in The Journal of the American Medical Association, Vol. 91, No. 1, July 7, 1928. Page 56.

"Alexander says: While certain of the therapeutic effects attributed to diathermy—such as increased temperature or bactericidal effect—are still in question and will afford ample ground for much disputation for some time to come, the prompt relief of pain, the great improvement in the general comfort, and the consequent uplift of the morale of the patient, give to diathermy an increasingly prominent place in the treatment of lobar pneumonia and pleurisy."

The Physiological Action of Diathermy in Lobar Pneumonia. Gage Clement, M. D., Duluth, *Archives of Physical Therapy, X-Ray, Radium*, May, 1928. Page 199.

This author says that "the effect of diathermy upon the patient's feeling is gratifying. He is quite promptly relieved of his pain, shortness of breath, cyanosis and restlessness. During 1927, out of 88 patients with uncomplicated lobar pneumonia treated at St. Luke's Hospital within forty-eight hours of the onset of the disease, none has died. The total number treated is 94 and the total number of deaths is six. In these six patients treatment was either started late, or the patient was aged, or there were severe complications. The average death rate for all cases is about six and four-tenths per cent. The average mortality of patients not treated with diathermy is about 20 per cent, and has been as high as 35 to 50 per cent."

"In the treatment of our pneumonia patients we use as large an electrode as possible both in front and behind. An electrode which does not cover more than the area of the consolidation, as outlined by percussion on the outside of the chest is not large enough. Tissues outside of the area of inflammation must be included in the region through which the current passes. The treatments are given twice daily and are of thirty to forty-five minutes duration. The total number of patients treated is 94. The number of treatments given is 611, an average of six and one-half treatments per patient. The average duration of the treatments is thirty-five minutes. The average milliamperage including the treatments given to children, is 1100."

Six Years Experience with Diathermy in Pneumonia. By Harry Eaton Stewart, M. D., New Haven, Conn., in *Archive Physical Therapy*, Vol. IX, No. 10, October, 1928. Page 439.

In his summary this author says:

"Reports received from all parts of the country and from abroad show a steady increase in the use of diathermy in pneumonia. After six years experience with diathermy in this disease, the writer, here for the first time, makes a definite claim, which he feels is now fully substantiated, for a lessened mortality in treated cases.

"It seems now to be established for certain that an agent of great value in the treatment regime of pneumonia has been found. The disease has not been shortened in our hands, but it has been made more tolerable and we feel, less fatal."

The Application of Physical Therapy to Acute Pulmonary Diseases. I. H. Alexander, M. D., Pittsburgh, Pa., *The Atlantic Medical Journal*, May, 1928. Page 531.

This author says that "one of the outstanding results following the use of diathermy is the almost immediate relief of pain. This is true, not only in the severe pain due to pleurisy so frequently associated with lobar pneumonia, but also in uncomplicated acute pleurisy.

"While certain of the therapeutic effects attributed to diathermy —such as increased temperature, bactericidal effect, etc.—are still in question and will afford ample ground for much disputation for some time to come, this prompt relief of pain, the great improvement in the general comfort, and consequent uplift of the morals of the patient, give to diathermy an increasingly prominent place in the treatment of lobar pneumonia and pleurisy."

The Use of Diathermy in the Treatment of Pneumonia. N. J. Seybold, M. D., Toledo, *The Ohio State Medical Journal*, March, 1928. Page 210.

This author says in conclusion that "diathermy when properly administered in pneumonia with regard to other conditions is devoid of danger. It is never an antagonist, but always an ally.

"It is the only measure that will place heat with safety and uniformity between two equal surface contacts.

"Heat used as a therapeutic measure, increases the local tissue resistance, increases cell metabolism, increases the cell nutrition, and increases blood supply to the part, thereby effecting the absorption of unorganized exudates.

"The blood pressure systolic and diastolic, falls slightly after a diathermic treatment in pneumonia. The respiratory rate becomes slower and cyanosis is decreased. I have noted in some of the pneumonias that cyanosis disappeared within ten minutes after beginning treatment.

"Failure of diathermy early in the disease to bring noticeable symptomatic relief indicates an unfavorable prognosis. See charts.

"The temperature generally dropped by lysis.

"Diathermy is a distinct and valuable aid in the treatment of pneumonia, can be used in all cases, is not a specific, and all other measures should be taken."

Diathermy in the Treatment of Lobar Pneumonia. John Severy Hibben, M. D., Pasadena, *The American Journal of Physical Therapy*, May, 1928. Page 68.

This author says in conclusion that:

"1. There is improvement in nearly every case of pneumonia treated with diathermy.

"2. The symptomatic changes being a lessening of the cyanosis and respiratory pain, with a slight lowering of the pulse and respiratory rate. Reduction in temperature by lysis eliminating that critical period which follows its abrupt fall.

"3. Diathermy, to be the most effective, should be used as early in the disease as possible. If seen in early stage, resolution by lysis in four or five days is the rule. If the case has reached the second or red hepalization stage before diathermy has been applied, improvement is not so marked. In stage of gray hepalization or resolution diathermy may be used providing the patient is not gravely toxic.

"4. Diathermy can be used as an adjunct to the treatment of pneumonia without interfering with any other recognized form of treatment.

"5. Before treating a patient with diathermy be sure of your water balance, that is, that the patient is not dehydrated.

"6. From a comparatively small series of cases studied, it appears that mortality has been reduced 60 per cent by the use of diathermy."

"In cases of hemorrhage and surgical shock diathermy holds a place second only to that of blood transfusion."

The Use and Abuse of Physical Therapeutics. F. Granger, *The New England Journal of Medicine*, April 26, 1928. Page 514.

This author says under bursitis "while in many of these cases the patients get well spontaneously without any treatment, if physical measures are employed pain is lessened, the time of disability is shortened, and the percentage of recoveries is increased.

"Neuritis. Focal infection should always be sought for and removed if found. The treatment should be individualized.

"Pneumonia. Diathermic heat is of value in this disease as it diminishes pain, improves transiently the heart's action, and induces sleep. These factors alone make it a valuable adjunct to other standard or routine methods of treatment. I do not believe that diathermy ever shortened the course of this disease, but by relief of pain and increasing the amount of rest it may tide the patient over until lysis or, rarely, crisis occurs. * * *

"Arthritis. Syptomatic cure is frequently attained by the use of diathermy and galvanism, and at times by the addition of autocondensation."

INSTALLING INSTRUCTIONS FOR THE FISCHER "SW-12" INTERMEDIATE

SHORT WAVE HIGH FREQUENCY APPARATUS

The installation and mechanical operation of this unit are very simple. Only one dial designated as "Patient's Control", a 5-point "Volume Control" switch and four patients outlets are employed to regulate the amount of current delivered.

Two "OFF" and "ON" switches, one for filament circuit, the other for plate circuit, and the "Volume Control" complete the mechanical features of the control panel. There is a receptacle on side of cabinet for plugging in foot switch, and another, for line current contact.

Installation of rectifying and power tubes is the only item to consider in the assembly of this unit.

First: Remove rear panel of cabinet.

Next, carefully unpack each tube and insert in sockets. Insert larger power tubes into sockets on lower shelf, pressing firmly while you rotate same clockwise until metal pins have slipped into slots in socket. Place spring clips (on copper leads) on metal cap on top of tubes.

Smaller (rectifier) tubes go into sockets in upper right hand corner (rear). Place loop end of connection over metal cap on top of tube.

REPLACE REAR PANEL

CAUTION: When Mercury Rectifier tubes are first installed it is necessary to leave the filaments lighted for 15 minutes before turning on the plate current. This will deposit all mercury in the base removing it from parts where it has been shaken in transit. It is not necessary to repeat this caution except after shipping.

Plug in your "line current" connecting cord and turn filament current switch to "ON", which delivers current to the rectifying tubes. Always turn on this switch first and give these tubes a few seconds to heat up before turning plate current switch "ON". If you observe this rule it will prolong the life of these tubes. If all tubes light up when filament switch is "ON" you are ready to apply electrodes and give a treatment. See that plate current switch is "OFF" when plugging treatment cords into "Patient's Current" outlets on unit, or otherwise you may burn your fingers.

CAUTION:

If line supplying current to this machine is excessively high; i.e., over 115 volts, and the output of the machine apparently is overstrong proceed as follows:

Just inside the back panel (near the bottom) you will find a small bakelite strip with 3 studs, also a brass connecting link from the center stud to the left side

which is marked 110. Remove hexagon nut and place this link over the center stud and the stud to the right, which is marked 120. This will throw a lesser load into the transformer and the machine will work more satisfactorily from a high voltage line.

Short wave high frequency machines were developed to permit the use of low voltage capacity electrodes. The use of capacity electrodes simplifies treatment technic.

The use of low voltage capacity electrodes demands higher frequencies than those employed when conduction (diathermy) electrodes were used.

The transformation of 60 cycle power into short wave current is accomplished in two steps or stages by the following construction units:

1. Power transformer.
2. High frequency power oscillator.

POWER TRANSFORMER

The power transformer raises the line voltage to proper potential. A 5-point "Volume Control" switch in series with the primary of the transformer serves to vary the output. For treatments not requiring a large amount of current, this switch may be set to point 1 or 2, or power may be increased to point 5 as desired.

RECTIFYING SYSTEM

The secondary voltage of the power transformer is rectified by means of 2 rectifier tubes, thus supplying the power oscillator with unidirectional current voltage. It is recommended, for the longest life and most efficient operation of such tubes, that the filament of the tubes (after shipment or any rough handling) be heated for 15 minutes before the power voltage is applied. This permits the mercury which has spread over the inner surface of the glass and elements to vaporize and settle in the base of the bulb. The manufacturer further recommends that before each treatment the filaments be heated for a few seconds before power voltage is applied.

POWER OSCILLATOR

The power oscillator consists of a tuned-plate-tuned-grid circuit employing two power tubes. A special form of inductance coupling is used for coupling the patient's circuit with the plate oscillating circuit. Current is measured by a single scale meter.

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OPERATING INSTRUCTIONS FOR THE FISCHER ULTRA SHORT WAVE HIGH FREQUENCY APPARATUS

CONDENSER PAD ELECTRODES

The short wave electrodes are made of a woven metal center, covered with flexible rubber.

Additional padding to increase the depth of heat production are generally used. Turkish towels or Terry cloth serve very well.

There should be no metal nor rayon clothing between the electrode and the skin.

Guard against the possibility of the accumulation of pools of moisture, as perspiration between the patient and electrodes will cause prickling, hot spots and if not corrected, blisters. Never disregard the patient's complaint regarding hot spots. These can occur and should be guarded against by proper padding.

One or more active electrodes may be used simultaneously with a general indifferent electrode and a multiple binding post (Catalog No. 866) as a convenience in attaching to the outlet on the machine proper.

When pad type electrodes are used, they are generally placed on as nearly opposite sides of the part to be treated as possible.

When the cuff or belt types of electrodes are used, they are placed around the limb (or the trunk) above and below the area to be heated. These cuffs should have an area considerably larger than the cross section of the part to be treated.

About the same principles of obtaining a concentration of heat may be followed in applying the condensor electrodes and the short wave currents as is followed with the metal plate electrodes and ordinary diathermy except that with short wave currents it is not necessary to be so exacting.

The indications for short wave seem to be those conditions in which heat for one reason or another would be indicated. The effects of heat, from the viewpoint of increasing the circulation in a given part and/or its effect upon the chemical changes that go on in the body, and the resulting benefits that are derived from these effects, are of tremendous value and do closely approximate nature's own method of combating diseases. The opinion of the best informed men whom we have consulted is that where heat is indicated there is some relation between the value of the application and the rise in temperature of the part desired to be treated, insofar as the application is kept within the patient's tolerance; at least, perhaps within the temperature of about 104 or 104.2 at which the blood supply appears to reach its maximum.

Undoubtedly a great deal of the confusion about the effect of the application of short wave has been occasioned by a lack of understanding of the electrical principles involved, in order to actually get the desired rise in temperature in the part desired to be treated. We must consider that the body is heated up by an actual passage of current, and it is the heat generated by the current on account of its passage through the body that is of value. Short wave unquestionably heats up insulated or isolated conductive portions to a greater

extent than does diathermy, and consequently affords a more even distribution of the heat on account of the greater number of avenues of heat production.

A further consideration in the application of short wave is, that the portion of the body immediately near the surface and underneath the electrode receives the greatest density of the current; thereby giving a tendency to heat up this portion somewhat excessively. So many nerve endings being located near the surface gives the patient a decided sensation of heat, even though the depths of that portion will be actually raised in temperature very slightly.

In considering the application of short wave with pads, wherein the area of entry of current into the body is less than the cross section of the part that is desired to be heated up, it is reasonable to assume that the current entering the body is at its greatest density in that portion immediately near the surface of the skin, and the heat generated there is greatest, thus giving the patient a great sensation of heat. As the current leaves the area immediately underneath the pad it spreads out more or less in all directions, seeking the path of least resistance through the body. As the current density in a particularly conductive area rises it causes current to seek out the somewhat less conductive areas to pass through. This gives us a very rapidly decreasing current density as the current leaves the area immediately underneath the electrode, that we may term the area of entry into the body.

The current density decreases depending upon the size of the electrode as compared to the possible area through which the current may pass. It is a well known electrical law that the heat generated by a current decreases as the square of the density of the current per cubic centimeter. In other words, if the current is going to decrease very rapidly in density as it leaves the area of entry into the body and the temperature generated decreases as the square of the density per cubic centimeter, then it is very apparent that the amount of temperature rise generated to any depth with pad electrodes that are comparatively greatly less in size that the cross section of the part we are trying to treat is practically nil, considering circulation and other effects.

When "cuff" electrodes are used where the area of the cuff electrode is considerably larger than the cross section of the part being treated, thereby causing the port of entry of the current into the body to be such that the current enters the body at a low density and then passes from one cuff electrode to the other through the part of the body where the cross section was less than the area of either cuff, a very substantial rise in temperature is produced deep in the tissues. In fact, by having the cuffs sufficiently large and sufficiently far apart any area may be heated to almost any desired temperature within physiological limits. The point is that cuff electrode must be considerably larger than the cross section of the part being treated, thereby allowing the current to enter the patient's body at as low a density as possible, in order to remain well below tolerance at that point; then have cuff electrodes as far apart as is convenient (the farther apart the more heat generated).

Due to the fact that where electrodes are of smaller area, thereby causing the port of entry of the current to be smaller in area than the cross section of the part you are trying to heat up, and resultingly giving a high surface temperature with very little heat in the depth, it will be found that there is practically no relationship between the patient's sensation of heat and the actual rise in temperature of the part being treated. With small pad electrodes the patient can be given a tremendous sensation of heat and practically no rise in the depth of the part being treated, whereas by using cuff electrodes,

giving a large area through which to have the current enter the patient's body, the heating will stay well within the comfortable tolerance of the patient and yet a very substantial rise in temperature in the parts being treated generated.

As it appears to be the opinion of the best informed men that the therapeutic value of the application of short wave is somewhat in proportion to the rise in temperature of the parts being treated, insofar as it is kept within the comfortable tolerance of the patient and within approximately 104 or 105 degrees in the depth of the tissues, it does appear that with cuff electrodes the therapeutic benefits should be vastly increased. It further appears that with small pad electrodes, where the heat is so patently immediately underneath the electorde, with very little penetration, while the apparent benefits we have received have not been entirely psychological, yet they must have been very small in therapeutic effect as compared to what might have been accomplished were the parts actually heated up to the point where there was a very perceptible temperature rise yet the application still being kept well within the tolerance of the patient.

An interesting experiment is to use the usual pad electrodes, front and back, give the patient all the current he can tolerate for, say, 20 minutes, and see how much actual rise in temperature can be given in the rectum or the vagina. Conduct the same experiment but place large cuff electrode, size 9" x 48" around the patient's abdomen and a large cuff electrode, size 12" x 40" around both thighs (legs together). Give the maximum amount of current that can be tolerated in both instances for the same period of time and you will note with the large cuff electrodes a great deal more rise in temperature is produced. On any and all parts that are susceptible to treatment with cuffs you can get a great deal greater rise in actual temperature by employing them. It is our recommendation that cuffs be used whenever possible.

Always bind the condenser pad or cuff electrodes snugly in place to maintain a uniform contact and thus avoid variation of heat production during the treatment. The current of the patient's circuit is tuned to the capacity of that particular circuit or application, and if the electrodes are placed loosely the capacity and heat production will vary with every movement of the electrodes.

Always keep connecting cords on electrodes well separated and at rest while treating. Tangled cords give a false amperage reading and swinging cords cause a fluctuation and variation of heat production. Do not have connecting cords in contact with patient or any material that would conduct those currents from cord to cord instead of through the patient. METAL CHAIRS AND TABLES MUST BE AVOIDED.

PATIENT'S CONTROL

The patient's control is a vernier control, operating in conjunction with the five-point volume control. Together, these two controls assure the continual increase of current to patient from zero to maximum, or a like decrease. In a word, current to the patient can be applied at any volume from zero to maximum.

FIVE-POINT VOLUME CONTROL

This control is placed in the primary circuit. It is unique in the FISCHER design. It works in combination with the patient's control in the secondary circuit, providing five major levels of current to patient, from zero to maximum.

Do not attempt to plug electrode cords into the outlets on the machine with the filament and plate current switches on.

With the electrodes applied, proceed as follows:

(1) See that the machine is connected to alternating current of 60 cycles, of from 105 to 120 volts.

(2) Set "Power Control" on point 1 - 2 - 3 - 4 or 5 depending on volume of heat desired.

(3) Turn on filament current switch, wait few seconds.

(4) Then throw plate current switch.

Now turn the "Patient's Control" slowly to increase or decrease current as desired. Meter needle movement will indicate which way to turn control. When meter needle reaches highest point and begins to reverse - you have reached the point of greatest output for the size of electrodes, the amount of padding used and the position of the electrodes in respect to one another. When the heat at this point is excessive - either turn "Patient's Control" in either direction or cut down on primary current with "Volume Control".

Should reading on milliampere meter continue to rise as the "Patient's Control" is moved over the entire range, without reaching the above described "highest" point, this indicates a change in padding is necessary. If in turning this control from right to left the needle continues to rise and does not reverse when zero position is reached more padding is necessary. If the heat at this point is insufficient with the additional padding the indication is that the electrode is too large - requiring still more padding. (Increasing padding is the equivalent of reducing the size of the electrode but more padding is preferable because of its more uniform heating). This experience will take place when using large electrodes. With very small electrodes the reverse may occur. The needle will rise as the "Patient's Control" is moved from zero to maximum without reversing, indicating too much padding or that the electrodes are too small. When in doubt as to the setting of the "Patient's Control" when beginning a treatment and to avoid undue momentary heating before making adjustment, it is safer to have used too much padding underneath the electrode than too little, and to be sure to start the treatment with the "Volume Control" on a low setting.

PATIENT'S CURRENT OUTLETS

On the Fischer short wave machines are four patient's terminals, providing a selection of three potentials (voltages). It is possible, with this arrangement to properly employ any size condenser electrodes, from the smallest to the largest, plate or cuff types.

In the following suggested technics, certain combinations of outlets 1 and 2, 1 and 4, and 3 and 4 are mentioned. It will be found that the smaller electrodes will work best when connected to outlets 3 and 4 - that medium sized electrodes will function best when connected to outlets 1 and 4 - and that the largest pads and cuff electrodes give best results with terminals 1 and 2.

CAUTION:

Heat generation from Short Wave currents begins gradually and accumulates. It takes a moment or so before the patient begins to feel what might be

Called nice comfortable warmth and that is what is wanted for reconstructive treatment. Too much current develops heat too fast and the skin may get too hot resulting in hot spots, blisters, burns, a dull ache, and demands close supervision. Never disregard a patient's complaint of "too hot". To make a demonstration of quick heat production, you may turn on all the heat the unit can generate for just a minute or two but for successful treatment purposes follow the conservative directions given above.

TREATMENT SUGGESTIONS

LIMBS

A Turkish towel or Terry cloth is folded and wrapped around the limb, below and above the area to be heated; a cuff type electrode of sufficient length to make a complete circle is then placed over this toweling and bound in place. Connect electrodes to patient's outlets Nos. 1 and 4. It is not always possible to select an electrode of just such length that will make a complete circle around the limb but overlapping will do no harm - or should electrode be a trifle short of a complete circle there will be very little difference in the heating effect. Simply select cuff electrode most adaptable.

Or place active electrode 5½" x 8½" (with some toweling between) on soles of feet. If patient is sitting, the feet are merely placed on the electrodes - if reclining, pads must be bound in place. A large indifferent pad electrode is placed at the patient's back. If patient is reclining, it is best to place this electrode on the abdomen with a folded Turkish towel under it, securely binding it in place. Use patient's outlets Nos. 1 and 4.

Such applications are more or less a matter of experiment and without such experimentation it will be impossible for any operator to ascertain the full value of the Short Wave Apparatus.

SHOULDER

Wrap a towel around the arm above the elbow, and around it a cuff electrode of sufficient length to make a circle. The other (medium sized plate) electrode is placed over a folded towel on the top of the shoulder, well over to the neck. (outlets 1 and 4).

To heat both upper arms and shoulder place cuffs (over towels) around both upper arms. (outlets 1 and 4).

Or a large plate or pad electrode is placed under the patient's back (with towel between), and several inches of insulating padding is placed on the abdomen. Upon this place a 5½" x 8½" pad electrode. The patient places both hands on this pad and maintains contact with the palms. A towel between the hands and this electrode, and wrapped about the hands and arms helps to confine the heat. (outlets 1 and 4).

BRONCHIA (Upper lung area)

Place 5½" x 8½" condenser pad electrode parallel to sternum with some toweling between it and patient. Bind on securely. Have patient sit with back against (or lie upon) a large indifferent electrode. (outlets 1 and 4).

GALL BLADDER

Place 5½" x 8½" condenser pad electrodes upon right side of abdomen on a line with the lower rib and extending from navel to the right - have towels between it and patient. Bind this electrode snugly in place. Place largest electrode on patient's back. (outlets 1 and 4).

FRONTAL SINUS

Place 2" x 4½" condenser pad electrode on two layers of heavy toweling on forehead, lower edge on line with eyebrow. Bind snugly with bandage passed around the head, anterior - posterior. Have patient sit on or place large electrode on back. (outlets 1 and 4 or 3 and 4).

FINGERS - HAND OR WRIST

Have patient sit on large pad electrode. Place three or four inches of padding on patient's lap with medium sized pad electrode on top, place finger or fingers in contact with this; in this manner the heat can be concentrated to the very finger tips by just contacting tips, by contacting more of the fingers' area the heat will be farther up to include hand or wrist. Covering the part with a towel will confine the heat. (outlets 1 and 4).

NECK (Anterior)

Place medium sized pad electrode over two layers of toweling on throat (anterior). Have patient lie on or sit with their back against the large electrode - toweling between it and patient. Be sure there is no metal in contact with patient electrodes and patient. Bind electrodes on snugly. (outlets 3 and 4).

NECK (Posterior)

Place medium sized pad electrode over a couple of layers of toweling on back of neck. Place 5½" x 8½" condenser pad electrode on about four layers of toweling on chest. The above will result in deep heat; for less depth use the large electrode as indifferent, toweling between it and patient. Be sure there is no metal in contact to patient between electrodes and patient. Bind electrodes on snugly. (outlets 3 and 4).

EAR (one only)

Place medium sized pad electrode on about four layers of heavy padding touching on side of ear from base of skull to cheek over ear to be treated. Bind this in place with bandage by passing bandage under chin and over head twice and around back of and under base of skull and over ear a couple of turns holding both ends of this electrode snugly in place. Place large pad electrode on opposite side of body under treatment, preferably under arm. Pad between arm and pad to keep arm from contacting this electrode. (outlets 1 and 4).

EAR (both)

Place a medium sized pad electrode over four layers of Turkish toweling or equal, on each side of the head from base of skull to cheek. A towel may be folded into a narrow strip, four thick, and passed across back of the head and over the ears with the electrodes placed on over this, then the whole is bound in place with bandage, passed under the chin and over the head twice then around

back of and under base of skull a couple of times until snugly bound in place. (outlets 3 and 4).

Fever Therapy (Hyperpyrexia)

The patient, with all clothing removed, is placed on a bed on which are not less than three woolen blankets, over a rubber sheet. Heavy Turkish toweling (or Terry cloth) is wrapped around both thighs (legs together, one electrode only). Over this is placed a 12" x 40" cuff type electrode, held snugly in place by bandage, but not too tight to cause cramping or other discomfort.

Similar toweling, and an electrode of 9" x 48" is placed around the abdomen. (outlets 1 and 2).

The patient is then wrapped in the woolen blankets and in turn covered with the rubber sheet. There should be two or more thicknesses of blankets over the patient. "Volume Control" switch on point 4 or 5. Current is turned on and tuned in to the maximum amperage reading. If the patient complains of too much heat it will be necessary to reduce the current by setting "Volume Control" switch down, or cut down by patient control. When the temperature of the patient is rising and has arrived at a point about 1 degree below the maximum desired, it is advisable to turn off the current as the temperature will continue to rise fully 1 degree without additional treatment. If the patient is thoroughly insulated with the blankets, the temperature will be maintained for considerable time after the current has been turned off.

(Electrocoagulation)

A foot switch outlet is located on the right hand side of cabinet. It is connected in parallel with plate current switch and naturally that switch should be left off when using the foot switch. Select either pointed or ball applicator as the active electrode, which is held in insulated handle and connect to the patient's outlet (outlet #1 or #2). Some experimenting will be required at first to determine amounts of coagulation at various settings. It will be found that no indifferent electrode is required for Electrocoagulation. The patient's body provides sufficient capacity, and the point or ball alone with just one cord and handle will work very nicely. Or the indifferent electrode (connected to 1 or 2) may be placed on the floor near base of machine. If coagulation is too slow, set "Volume Control" up to a higher point. If coagulation is too fast, set "Volume Control" down to 1 or 2.

To Obtain Electrosurgical Tissue-Cutting Current

Have the patient in contact with one of the large condenser electrodes which in turn is connected to patient's outlets (outlet #1) on the panel. Any of the cutting devices shown on page 11 of the Fischer Accessories Catalog (No. 30) may now be used, by setting them into proper insulated handle which in turn is connected to patient's outlet (outlet #2) on the panel. Cutting current may be increased or decreased by changing settings of "Patient's Control".

A clean incision with little or no side wall dehydration is obtained from practically the same settings of the machine controls as a cut with much side wall dehydration. The speed of the moving blade controls this factor to a great degree. The faster the blade is moved the cleaner the cut, and contrarily if the blade is moved slowly through the tissues dehydration will rsult.

It will be found in many instances that no indifferent electrode is required for tissue-cutting. The patient's body provides sufficient capacity, and the blade alone with one cord will work very nicely. Or have the patient sit or lie upon a large condenser pad as the indifferent electrode. This pad is placed to suit the patient's convenience; or the indifferent electrode may be placed on the floor near base of machine. When cutting, turn current on in patient's circuit, with foot switch, before contacting patient with active electrode. If cutting is too slow, set "Volume Control" up to a higher point. If cutting is too fast, set "Volume Control" down to 1 or 2.

CAUTION:

DO NOT HAVE PATIENT SITTING ON METAL CHAIR OR LYING ON METAL TABLE WHEN USING EITHER CUTTING OR COAGULATING CURRENTS FROM SHORT WAVE APPARATUS.

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